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Happy Christmas

from Wallie

Pretoria S. A. Xmas 1911

The Transvaal and its Mines.

(The Encyclopedic History of the Transvaal.)

☆ ☆ ☆ ☆

EDITED BY

L. V. PRAAGH.

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HIS EXCELLENCY THE EARL OF SELBORNE, P.C., K.C.M.G.,

HIS MAJESTY'S HIGH COMMISSIONER FOR SOUTH AFRICA, AND GOVERNOR OF THE TRANSVAAL AND THE ORANGE RIVER COLONY.

6.82

PREFACE.

THE purpose of "THE TRANSVAAL AND ITS MINES" is to create a standing Work of Reference on the most important of the two South African Colonies last added to the Empire. The various subjects dealt with in the Work have had to be of necessity summarised; space would not admit of detail treatment: but, as far as practicable within the limits of one volume, a comprehensive description of the institutions and industries of the Transvaal is presented.

The Editor takes this opportunity of publicly acknowledging the services of all those from whom the Work has received assistance and encouragement. Especial thanks are tendered to Mr. F. V. Kirby, to Mr. Stephen Court (Town Statistician, Johannesburg), and to the various members of the staff employed.

To Messrs. T. O'Byrne, Duffus Bros., and J. A. Simpson (Johannesburg), Mr. R. C. E. Nissen (Pretoria), Mr. F. Coop (Potchefstroom), Messrs. J. & M. Lazarus (Lourenço Marques), and numerous others of the photographic profession in various parts of the country, the thanks of the Editor is due. The illustrations are a special and distinctive feature of the Work, and their execution and classification entailed considerable labour.

The Editor desires to express his obligation to the Government for their assistance in checking information and statistics contained in the subject-matter relative to the various departments, and also for their generous support in having undertaken to acquire a certain number of copies of the Work when completed.

JOHANNESBURG,

September, 1906.

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The Early Voortrekkers.

Summary of Incidents up to the Period of Final Annexation.

PROBABLY no country in the world during the comparatively short time it has been under the rule of civilised races has had a more romantic history than the Transvaal. Twice since its occupation by white people it has been in the possession of the Boers, and twice under the British flag; while from a state of abject poverty it has risen to its present position of importance, owing to the development of its vast mineral wealth, making it one of the richest countries in the world. A little over a quarter of a century ago the existence of such a territory as the Transvaal (or "South African Republic," as it was then called) was barely mentioned in the school geography books. From the 1880 war onward, however, each succeeding year has found a greater interest being taken in this country, and for years to come it seems destined to occupy a foremost position. The history of the Transvaal begins with the "Great Trek," or exodus of the frontier Boers of the Cape Colony. The pastoral Boers were accustomed already to leading a semi-nomadic life. From the elephant-hunters among them they received continual information of the state of the country to the north. The wheat-farmers and wine-farmers in the west and south did not move. They had a more established stake in the country, and the native question did not affect them. Being dissatisfied, especially with the liberal policy of the British Government towards the natives, these frontier Boers removed northwards in large numbers between the years 1833 and 1837. Many ended their trek after crossing the Orange River, and founded the Orange Free State (now the Orange River Colony); but a still larger number, under the leadership of Hendrik Potgieter, pushed further to the north, and by 1836 some thousands had already crossed the Vaal and reached what is now the Transvaal. This territory was mostly at the time under the sway of a powerful refugee Zulu chief Moselekatze, whose principal kraal was at Mosiga, in the present Marico district in the Western Transvaal. To avenge the massacre of some wandering bands, the Boers under Maritz and Potgieter attacked and utterly defeated Moselekatze at this place in 1837. In the following year the Zulu chief withdrew with his tribe beyond the Limpopo, and occupied the country which was afterwards known as Matabeleland.

The Dutch soon afterwards settled along the slopes of the Magaliesberg. On the banks of the Mooi River they built a town which they called Potchefstroom. Here it was that, later, the first Volksraad of the Transvaal sat. While Potgieter explored the Mooi River, Retief, with a large section of the trekkers, had discovered passes

A STREET IN POTCHEFSTROOM, THE ANCIENT BOER CAPITAL.

over the Drakensberg (they being the first white men to cross the range), and descended into Natal with nearly a thousand wagons. They were received with apparent friendship by Dingaan, the fierce Zulu chief. To the followers of Potgieter there came the story of Retief's treacherous murder by Dingaan, and of the attack on the Boer camp at Weenen ("weeping"). Not long after this, the Boers under Uys, Maritz, and Potgieter were again defeated, when many Boers fell before the irresistible onslaught of the disciplined Zulu warriors. At this critical juncture the Boers were saved from utter extermination by the arrival of Andries Pretorius, of Graaff-Reinet, at whose hands Dingaan met with his first great defeat. On Dingaan's Day," 1838, the Zulus were driven back with great slaughter, and the chief kraal, Umkungunhlovo—where Retief's party had been murdered—was burnt to the ground. In January, 1840, the Zulu army was utterly destroyed. Dingaan soon afterwards was murdered, and his younger brother, the friendly Panda, was set up in his place. Natal was proclaimed a Boer Republic, but British settlers were already at Durban, and the British occupation of the territory in 1843 induced the Boers to retire in two bands across the Drakensberg, the southern division settling in the present Orange River Colony and the northern portion passing into the Transvaal. It must now be mentioned that Pretorius, the conqueror of Dingaan, proceeded with the Boers into the Orange River Sovereignty, in which British rule had been proclaimed in 1848. He refused to recognise British authority, and induced many of his countrymen to join him. The insurrection, however, proved abortive. The Boer leader and his followers were defeated at the battle of Boomplaats by the troops under Sir Harry Smith, and Pretorius was compelled to fly across the Vaal River. His arrival in the Transvaal was unfortunate for the new country of his adoption. He wished to assume the leadership, which was naturally disputed by Potgieter. The latter claimed to have been the first to occupy the country north of the Vaal, and naturally looked upon Pretorius as an interloper. Pretorius, however, said that he had conquered Dingaan and besieged Durban, as well as having fought at Boomplaats. He insisted that this gave him the claim to leadership, while he also reproached Potgieter with being friendly with the British.

THE DINGAAN MONUMENT, BELFAST, TRANSVAAL.

The trekkers thus became divided into two factions, and all attempts at establishing an organised system of government throughout the Transvaal failed. A civil war seemed close at hand, but the strong common sense of the two leaders finally prevailed, and they agreed to the election of a Volksraad and the formation of a central Government. The government thus established was of the crudest possible description. The Volksraad was unfamiliar with the art of law-making, and some of its regulations in the light of succeeding events seem very strange. For instance, no Englishman or German was allowed to possess land, no one was to declare himself insolvent, and no one was to prospect for minerals. In 1852, Pretorius was instrumental in inducing the British Government to sign the memorable Sand River Convention, by which Great Britain acknowledged the independence of the infant Republic. It was agreed that the Boers should be left free to manage their own affairs, that the Vaal River should be the southern boundary of their territory, and that slavery should not be permitted. The death of both Pretorius and Potgieter in 1853 prepared the way for a period of internal peace under the eldest son of Pretorius, Marthinus Wessels Pretorius, who was elected the first President of the "Dutch African Republic" in 1853. The name of the country was afterwards altered in 1858 to that of the "South African Republic." But a vital element of weakness

lay in the persistent refusal of the Boers to treat the natives as free men, or even with common justice. The murder of Hermanus Potgieter in 1854 was avenged by Pretorius at Makapan's cave, and was followed in 1856 by the "Apprentices' Law," establishing a system of indentured labour, which has been held by many to be equivalent to a disguised slavery. This was a most extraordinary document, and as it gave rise to a considerable amount of subsequent trouble and misunderstanding it may not be out of place to refer to some of its provisions. It was laid down that while the equality of coloured persons with white inhabitants either in Church or State would not be permitted, the promulgation of the gospel among the native races, subject to certain precautions to prevent the teaching of erroneous doctrines, would be allowed. As a matter of fact, from first to last the Boers put every obstacle in the way of the missionaries, and missionary work by their own Dutch Reformed Church was a thing unknown. With the "Apprentices' Law" still on the statute book they yet affirmed in Article 10 "the people shall not tolerate any slave traffic or slavery in this Republic." Against this it may be stated that in the country districts, especially in the early days, it was a common occurrence, with the connivance of the authorities, for natives to be flogged for refusing to perform gratuitons labour—or, as the Boers put it, in return for the protection which those natives received. In the light of modern ideals, much of this may seem harsh, but allowances must be made for the primitive life of the Boers in the period under review, and the difficulties they had so bravely surmounted in their subjugation of the native have also to be considered. It must be remembered that under tribal law labour and military service were due to the chief. The tribes were broken up, not by the Boers, but by Moselekatze's Zulus, who reduced the Transvaal natives to virtual slavery. It was only natural, therefore, that Boers who had expelled Moselekatze should look upon themselves as holding a position somewhat analogous to that of the former tribal chiefs. From the point of view of the native it had been a common thing for a refugee from one kraal to place himself in a semi-servile position to the chief whose protection he received: and it did not seem unnatural for them to render the same service to the Boer. Further, although these Boer *voortrekkers* have been given a reputation by some writers for brutality to the native, it is remarkable that single Boers habitually trusted themselves on lonely farms or on trek with numbers of natives, thus giving every opportunity for revenge had the natives been inspired by any such desire. Among the Boers, as in any other community, there were occasional "black sheep," from whom the whole flock should not be judged.

The Volksraad was constituted the supreme legislative authority in the country, while the proposition and execution of the laws was entrusted to an Executive Council. This body had practically the power of appointing all State officials, the ratification by the Volksraad being purely a matter of form. It was further enacted that the maintenance of peace should be entrusted to a Council of War (Krijgsraad), and that the judicial power should be placed in the hands of the Landdrosts, the equivalent, with somewhat enlarged powers, of the English magistrates, and such other persons as were sworn for that purpose, and according to Article 15 it was left "to their judgment and conscience to act in accordance with the laws of the country." It was around this article that a dispute in after years between the Executive and the Judges chiefly centred. Potchefstroom on the Mooi River was fixed upon as the capital of the Republic and Pretoria as the seat of the Executive Government. Religious equality was a thing unknown to these early settlers, which seems somewhat remarkable seeing that the ancestors of many of them had left Europe on account of persecution for their religious beliefs. It was laid down that the people were desirous of maintaining the doctrine of the "Nederduitsch Hervormde" Church as established in the years 1618 and 1619, and that this should be the State Church of the Transvaal. It was also stipulated that the people should not appoint any other representatives in the Volksraad than members of the State Church, while Article 21 read "The people does not choose to allow in its midst either any Roman Catholic Churches or any other Protestant Churches than such as inculcate the same principles of Christian belief as laid down in the Heidelberg Catechism." As regards the protection of the State, it was enacted by Article of Grondwet No. 26 that in the event of a hostile invasion every one without distinction should be bound to render assistance upon Martial Law being proclaimed. This was another clause that gave trouble in after years. Some of the conditions of eligibility for membership of the Volksraad were characteristic. For instance, members could not be related to one another in the degree of father and son, full or half-brothers, or uncle and nephew by consanguinity, though this was subsequently modified. It will be seen from the extracts given upon what a very restricted basis the new State was formed. Owing to this policy of opposition to everyone not of their way of thinking, difficulties were early met with. The English traders who were disposed to deal fairly with all were discouraged, while the missionaries were actually subjected to ill-treatment, as was shown by the plundering of Livingstone's house by the commando sent against the native chief Sechili.

As a matter of fact the authority of the Government set up by Pretorius was very feeble, and had by no means the unanimous support of the people. Zoutpansberg, Utrecht, and Lydenburg each formed a little republic of its own, so that there were thus four parties in the State each declaring the rest rebels. To strengthen his position Pretorius resolved on a bold stroke. He determined to force the Orange Free State into a union with himself and his followers. For this purpose Pretorius and Paul Kruger in 1857, at the head of a commando, crossed the Vaal River and invaded the Free State. When the news of this movement reached Bloemfontein President Boshof, the second President of the Republic, called out his burghers, and at the head of 800 horsemen marched to meet Pretorius and Kruger. The two bodies of men met at the Rhenoster River near Kroonstad, and they nearly came to hostilities. The Free State men placed their crude artillery in position, and in another minute blood would have been shed. But the Transvaal Boers sent Paul Kruger into the Free State camp with a flag of truce. A few days afterwards a treaty was signed in which Pretorius acknowledged the illegality of his act and engaged that it should never be repeated. The disorders produced by the jealousy of the four miniature republics led to several efforts to unite them into one strong government. Zoutpansberg was incorporated with the main republic, and Lydenburg soon followed. In 1860 Marthinus Wessels Pretorius asked for six months' leave of absence to visit the Free State, and soon afterwards wrote that he had accepted the presidency of that country. This step on the part of Pretorius gave great dissatisfaction, and from 1860 to 1863 the South African Republic was given up to lawlessness and strife. A Mr. Schoeman acted as Vice-President, but was deposed by the Volksraad in favour of one Rensburg. Schoeman turned

Rensburg out of office, and, when summoned to appear before a court martial, fled to Potchefstroom, and placed it in a state of defence. Commandant Snyman and Paul Kruger bombarded the town with artillery for three days from a safe distance. No damage was done and no lives were lost.

These disorders continued until 1864, when Mr. Pretorius was accepted by all parties as the legally-elected President and Paul Kruger as Commandant-General, or military head of the Transvaal. Meanwhile the Baramapulana tribe, which inhabited a mountainous tract of land in the north of the Republic, had become very strong in numbers owing to an influx of broken clans from beyond the Limpopo. It was in possession of a good many guns supposed to have been procured from vagabond whites who had penetrated the neighbourhood, and was disposed to resent any interference with its actions. In a feud a brother of the chief was obliged to flee, and was protected by the Transvaal Government, a circumstance which greatly annoyed his opponents. In April, 1865, when searching for a fugitive offender, some of the lawless Europeans and a party of blacks who were assisting them committed acts of great violence upon the outposts of the tribe, and a general war was brought on. For more than three years the Republic strove in vain to subdue the natives. There was no money in the treasury, and the Government was actually at one time unable to raise sufficient funds to pay for the carriage of ammunition from Durban. The burghers of the southern portion of the State refused to take part in the war. Kruger did all that man could do with the slender means at his disposal, but he was at length obliged to withdraw discomfited. The village of Schoemansdal, the centre of the ivory trade, and the residence of a landdrost and a clergyman, was abandoned by its inhabitants when the feeble commando retired, and it was afterwards burnt by the enemy. The European settlers were obliged to withdraw for safety from a large part of the district of Zoutpansberg, to which they were never able to return. The Baramapulana, however, felt the want of commercial intercourse, and in July, 1868, expressed a desire for a renewal of friendship, at the same time offering to pay tribute, when peace was gladly made on conditions which by no means secured the absolute supremacy of the Republican Government. The white people had thus lost ground, and the fact of their having done so made it more difficult than before to preserve order among the natives, more especially on the eastern frontier.

In one respect only the country showed signs of progress—in the number of churches built and the clergymen engaged. Yet even in religious matters there was constant strife between the churches, whose differences must always appear trifling to outsiders. A generation had grown up without a knowledge of books or of events beyond their own little circle. The rivers were unbridged, there were no public offices worthy of the name, the treasury was always empty, and the salaries of the officials—trifling as they were—could seldom if ever be paid when they fell due. Commerce

MR. THOMAS FRANCOIS BURGERS, the Second President of the Transvaal.

was carried on chiefly by means of barter, as gold and silver were exceedingly scarce. Still on the farms anything like want was unknown, for the flocks and herds throve and increased in the rich pastures. The war with the Baramapulana was hardly concluded when fresh difficulties arose through the Baralong tribe of Montsiao, and other clans on the west, setting up a claim to independence and to the possession of a territory of immense extent. The Republic was not in a position to exert its authority by force of arms, and indeed the matter was hardly considered worthy of much notice until the discovery of diamonds along the lower Vaal gave importance to the claim. Then President Pretorius and Her Majesty's High Commissioner for South Africa arranged that the difficulty should be settled by arbitration, and each party appointed a representative to form a court with Governor Keate of Natal as final umpire. Governor Keate's award gave to the tribes the independence they claimed, and even took from the Government at Pretoria a large district that had been occupied by white people ever since the great migration. As soon as the award was known President Pretorius was obliged to resign, for the Volksraad maintained that he had exceeded his authority in making the agreement with the High Commissioner and declared that they were not bound by his action. The High Commissioner, however, announced that he would enforce the award, though he did not take possession of the territory cut off from the Republic by it. And now there was a general cry that a clever man capable of conducting business on equal terms with the Queen's representative in Capetown must be found to fill the office of President of the Transvaal Republic.

The Rev. Thomas François Burgers, a clergyman who had abandoned the orthodox Church, and whose name was then prominently before the public, on account of the skilful manner in which he had conducted some difficult cases in the law courts of the Cape Colony, seemed to possess the requisite ability, and he was elected by a nearly unanimous vote. Mr. Burgers was an able and active man, with large persuasive powers, but he was a dreamer. He dreamed of a powerful and prosperous Republic, with colleges and telegraphs and railways, with a high name among the nations of the earth; and he imagined that it could be formed offhand out of a few thousand uneducated men whose mode of thought was of the 17th century, and such immigrants as he could induce to join him from Holland. Two years after his election he induced the Volksraad to send him to Europe to negotiate a loan for the purpose of constructing a railway from Pretoria to Delagoa Bay, and to engage teachers for a number of State Schools. In Holland £90,000 was subscribed towards the loan, and with the money railway material was purchased, and sent out to rust and rot away at Delagoa Bay, for no more could be borrowed. A Superintendent-General of Education was engaged and some other minor officials, and with these the President returned to Pretoria, to find that during his absence the followers of Sekukuni, who occupied a wild and rugged tract of land on the

Olifants River, had acted in a manner that no Government could tolerate. A large commando was called out to punish the insurgents, but the burghers assembled with great lack of enthusiasm. The President was to lead it in person, and as he was in religion an Agnostic they feared that the blessing of God could not rest upon the enterprise. So strong had this feeling become throughout the country that a large number of families rather than remain under his Government were moving away to seek a new home beyond the Kalahari desert. One strong native place was taken which the President in overdrawn language wrote of as the "Gibraltar of the South," but this success did not give heart to the farmers. An attempt to take another stronghold failed, chiefly owing to the conduct of the burghers themselves, and then there was a perfect stampede homewards, which all the efforts of Mr. Burgers could not prevent. Some days later the fugitives reached Pretoria, and no hope of speedily suppressing the rebellion was left. The Volksraad was hastily convened, when it was resolved to engage men wherever they could be obtained, at £5 a month, rations, and a farm of four thousand acres when the disturbance was quelled. To meet the expense heavy war taxes were imposed. But the country was quite unable to bear this strain. The ordinary charges of government and the interest on the public debt could not be met, much less an additional burden. And so the whole administrative machinery broke down. The Republic was really in a pitiable state, without money or an army, with rebellion triumphant, and a general election approaching which it was feared might result in civil war.

While things were in this condition Sir Theophilus Shepstone, previously Secretary for Native Affairs in Natal, was sent by the British Government as a Commissioner to Pretoria, with very large powers. The traders in all the towns, despairing of any prospect of security for the country, sent in petitions to Sir Theophilus Shepstone for annexation to the British, which, in accordance with Lord Carnarvon's instructions, he was only too eager to approve. President Burgers abandoned all hope of maintaining the independence of the country, and on the 12th of April, 1877, Sir T. Shepstone issued a proclamation declaring the country a British possession, and thereupon assumed supreme control. The President received a pension, retiring under nominal protest, while the only real expression of dissent came from the Vice-President, Mr. Paul Kruger. One of the reasons assigned by Sir Theophilus Shepstone for the action which he took was that the territory was in danger of being overrun by the Zulus, and if that was really so, the circumstances would go a long way to support his proceedings. It must, however, be said that the Boers had never expressed a fear of such a danger, and always alleged that they could repel Cetewayo's armies much more easily than besiege a fortified mountain stronghold. The Zulu chief was undoubtedly at this time trying to play off Natal against the Republic; and, further than this, the bulk of the residents in the towns and villages, who were principally English and German, requested the Commissioner to declare the country a British dependency, as the only remedy against anarchy, and so the farmers did nothing to oppose him and his slender escort. A considerable military force now entered the Transvaal, and peace was declared with Sekukuni. The country was re-named the Transvaal, and apparently the new government was firmly established. Trade revived, money flowed in, and property of every kind increased in value. But the farmers were dissatisfied with the loss of their independence, and accepted the British rule in a very sullen manner. At the annexation Sir T. Shepstone had promised the people that they should be governed by their own Volksraad and laws. This promise was not fulfilled, and murmurs of discontent began to be heard. Had

THE FAMOUS PAARDEKRAAL MONUMENT AT KRUGERSDORP
(erected to commemorate the defeat of the Zulu hordes under Dingaan by the Boers).

Here in 1880 the Boers assembled to take oath to recover their independence and throw off British rule.

H. P. N. Pretorius
(*Pretoria*).

H. Schoeman.

Hans Botha
(*Zwartkopjes*).

Piet Steyn
(*Lydenburg*).

Jan du Plessis de Beer
(*Wonderboom*).

Hans Erasmus.

J. D. Weilbach
(*Langes Nek*).

Louis Fourie
(*Langes Nek*).

J. D. Muller
(*Lydenburg*).

H. R. Lemmer
(*Potchefstroom*).

S. P. Grove
(*Middelburg*).

G. Engelbrecht
(*Standerton*).

BOER COMMANDANTS OF THE 1880-81 WAR (Kommandants Vrijheidsoorlog, 1880-81).

self-government been granted under British rule it is probable that war would have been averted; but the Home Government was listless and

"FIGHTING GENERAL" FRANZ JOUBERT,

who commanded at Bronkhorst Spruit on the 20th December, 1880, when Col. Anstruther of the 94th Regiment was mortally wounded and 100 of his officers and men, surprised on march to Pretoria, were killed or wounded.

indifferent. The Boers were not men quietly to endure being deprived of a share in the government of a country their fathers had won so hardly. At the same time their respect for the military power of the British was shaken by the disaster of Isandshlwana, where a British force was annihilated owing to the lack of most ordinary precautions. A mass meeting was held at Doornfontein (now a prosperous suburb of Johannesburg), and a petition was taken round, when 6,500 signatures were obtained against annexation. Sir Theophilus Shepstone was a South African by birth, and was always ready to listen to grievances, but he was replaced as Administrator by Sir O. W. Lanyon, whose cold, pompous, military bearing repelled and irritated the burghers. The feeling now rapidly gained ground that if peaceable means to obtain the restoration of independence of the Transvaal did not soon succeed, an appeal to arms ought to be made. The Boer women had always had great influence in public affairs, and on this occasion their voice was decidedly in favour of war. Mothers encouraged their sons, wives their husbands, to act as men, and said that if they were beaten they could die the death of patriots, or move away to the unknown North as their fathers had done before them.

At this time Sekukuni again gave trouble, but Sir Garnet Wolseley, having settled the affairs of Zululand, entered Sekukuni's country with a strong body of troops, and aided by a band of Swazis marched against that truculent chief. Sir Garnet inflicted great damage upon the tribe, and took the Chief himself a prisoner to Pretoria. This removed the last danger which had induced the burghers to submit to British rule. So long as a robber chief maintained his independence in such an impregnable position as Sekukuni held, there had been a motive for leaving the obligation for defending the country in the hands of the British. Shortly after this event intelligence reached the country that Mr. Gladstone had succeeded the Earl of Beaconsfield as Prime Minister of England, and as the new Premier when in opposition had denounced the annexation as unjust, the farmers not unnaturally thought that he would give them back their independence. Mr. Gladstone as a matter of fact when out of office had denounced the annexation as an "insane attempt to coerce the free subjects of a Republic." Upon regaining office he was asked to redeem his pledges, but he declined to comply. An attempt to seize the wagon of a farmer who refused to pay a tax brought a number of the Boers' friends to the rescue, and the officials at Potchefstroom, though supported by a strong military force, were openly set at defiance. The Boers were now convinced that they must fight for their independence, and another mass meeting was held at Paarde Kraal, now known as Krugersdorp, which lasted for a week. They resolved on war, and they determined that if they were beaten they would burn their homesteads and migrate north of the Limpopo. On Dingaan's Day, December 16th, 1880, the flag of the Republic was hoisted, and after several days' discussion it was resolved to commit the Boer cause to Almighty God, and live or die together in a struggle for independence.

By this time Paul Kruger had become a great power in the Transvaal, far more so than even Mr. Pretorius or Piet Joubert. At the meeting in question, Mr. Kruger referred in the strongest terms to the non-fulfilment by the British of their obligations. Here it may be mentioned that Mr. Paul Kruger was one of the first of the old Dutch officials to accept office under the British regime, and was a daily visitor at the British residency occupied by Colonel Sir Owen Lanyon. The dispute he had with the British Government was as to whether he should receive £500 or £400 a year, and as the British Administrator decided on the latter figure, Paul Kruger went away in disgust. In fact cynical commentators have gone so far as to speak of the non-payment of this £100 in dispute as the cause primarily of the first war between the Boer Republic and the British. A triumvirate consisting of Messrs. Paul Kruger, M. W. Pretorius, and Piet J. Joubert, were elected to conduct the government, and to these three the Volksraad delegated its powers as the supreme legislative authority. It was decided that Heidelberg should be the capital until Pretoria could be recovered, and the flag of the Republic hoisted there again. The Boers at once organised three commandoes, one of which went to Potchefstroom, one to Heidelberg to proclaim the new Republic, and the third was sent to intercept the 94th Regiment, which had been ordered to march from Lydenburg to Pretoria. The boldness with which this war was undertaken by the Boers certainly proved that the European blood had not degenerated by removal to South Africa, as many persons had previously assumed.

And here it may be asked how it was that the same men who dared not face danger in the commando under President Burgers went through this war

MR. N. J. SMIT

(a Vice-President of the old Republic), "Fighting General," 1880-81 war.

for independence with the bravery and devotion of ancient Spartans, and yet afterwards claimed no glory for what they had done. The reply is that religion caused the change. In one instance they believed that the Almighty was against them because the leader was not of the true faith, in the other they believed most thoroughly that the Almighty was with them guiding and strengthening them in the unequal fight. It has been said that it was this and this alone that turned the fugitives from Sekukuni's hordes at Steelpoort into the same men that took Majuba Hill from the British. On the same day that the flag was hoisted the first blood was shed. A party of burghers under Commandant Cronje being sent to Potchefstroom to have a proclamation printed, was fired upon by the military, with the result that one of the burghers was badly wounded. Colonel Winsloe, who was in command, had a camp outside the village and had also fortified the Landdrost's office and some adjoining buildings, in which a garrison was stationed under Major Clark. Cronje returned the fire, and then laid siege to the buildings occupied by Major Clark, who after holding out for two days was obliged to surrender. Colonel Winsloe, however, held the camp throughout the war and only surrendered it after an armistice was entered into.

Disaster after disaster now attended the British arms. In December, 1880, 260 men of the 94th Regiment under Colonel Anstruther were ordered to march from Lydenburg to reinforce the garrison at Pretoria. Colonel Anstruther was warned that he might meet with resistance on the way, but having a very poor opinion of the fighting powers of the Boers, he took no precautions whatever. On the 20th of December he was marching carelessly with a long baggage train, without even having taken the precaution to throw out scouts, when at Bronkhorst Spruit, about 38 miles from Pretoria, he suddenly found himself in the presence of a force of about double the same number of farmers, under Commandant Franz Joubert, which was so well placed that he never realised its actual strength. A man stepped forward with a white flag and handed a letter to the English Colonel signed by Joubert informing him that if he advanced another yard the movement would be taken as a declaration of war. Colonel Anstruther replied, "My orders are 'Go to Pretoria.'—Do as you like." The next moment the Boers opened a hot fire, and in less than ten minutes 100 officers and men were either killed or wounded, and the rest, being without ammunition, had to surrender. In this engagement Colonel Anstruther was mortally wounded. Information of the fight reaching the towns in the Transvaal, they were at once put into a state of siege, and interesting stories might be told of the subsequent investment of Pretoria, Potchefstroom, Wakkerstroom, Lydenburg, Rustenburg, and Standerton.

When the news of the outbreak reached Natal, Sir George Colley, the Governor, collected a miscellaneous body of rather over a thousand troops for the purpose of assisting his countrymen in the Transvaal. These he had to gather together mostly from isolated garrisons in Natal and from the reserves stationed in Durban, and with them he set out to assist the troops in the Transvaal, who, with the loyalists, were beleaguered in the various towns and villages. On learning of this movement Commandant General Joubert entered Natal with a force superior in number, and occupied a strong position at Laing's Nek, on the road along which the British General must march. The Boers to the number of 4,000 occupied both sides of the road up which the English forces were coming, and large stones and entrenchments were used as a protection against the artillery, which the Boer farmers dreaded. The British guns shelled the Nek, doing little damage, and in a short time the order came to cease firing and for the mounted troops to charge. When the heads of the cavalry were seen above the ridges a volley was poured in that emptied half the saddles, and the survivors were too few to continue the attack. Then the infantry charged up the long steep road, slippery with recent rains, only to have their ranks swept by a fierce fire. Colonel Deane was mortally wounded, and his men retired. General Colley retreated to Mount Prospect, four miles distant, where he waited for reinforcements. Ten days later, finding his line of communication was imperilled, he moved out of his camp with about 300 men to clear the road to Newcastle. When on the Ingogo heights he was attacked by the Dutch forces. Sheltered behind rocks and in the long grass they kept up a galling fire which lasted from noon until sunset. All the gunners were shot down by their guns. After darkness set in, rain fell, and leaving the dead and wounded where they had fallen, General Colley again retired on Mount Prospect.

MR. S. J. P. KRUGER
("OOM PAUL"),
late President of the South African Republic.
(*From a photo taken in the early eighties.*)

A few reinforcements having arrived, General Colley hastened to strike a blow which he believed would retrieve his former disasters. On the night of February 26th he marched out of camp with 600 men, and after about seven hours' hard climbing, reached the top of Majuba Hill, a lofty mountain which overlooked the Boer camp. By three o'clock in the morning the British troops were on the top, but exhausted with their exertions. At sunrise the Boers in camp 2,000 feet below discovered that the mountain was held by the British, and the news spread rapidly that the English were on Majuba. Expecting every moment to be shelled there was a gathering in hot haste of the oxen, and preparations were made to inspan the wagons. But no shells came, for the simple reason that no artillery had been carried up. General Smit, who was then "fighting General," called for volunteers to follow him in storming the mountain. A body of Boers thereupon collected at the base under the protection of a cliff, and boldly began to climb the face of the mountain on two sides, while Joubert detached a large force to support the storming party with long range shooting. The climbers rested where they found shelter, hiding in the long grass and behind rocks. Nearer and nearer to the summit they crept, all the time keeping up a heavy and accurate fire. The English soldiers found it difficult to fire at foes of whom they could only catch an occasional glimpse. When the Boer storming

party arrived at the top of the mountain, the troops prepared to charge with the bayonet, but the terrific rifle fire poured upon them swept away

GENERAL P. J. JOUBERT

(*Commandant-General during the* 1880-81 *war, and during the first portion of the Anglo-Boer war of* 1899-1902. *Wounded at Lombard's Kop, near Ladysmith; died at Pretoria*).

their formation. Only about 150 of the Boer volunteers reached the top of the hill, the rest having refused to face the British fire. A little before noon General Nicolas Smit with 70 or 80 men reached the crest, and then the British soldiers were seized with panic. General Colley was shot in the head and fell dead. The soldiers turned and fled down the mountain sides. Few of the fugitives would have escaped had not the Highlanders, who were entrenched on a ridge lower down, covered their retreat. The Dutch devoutly explained their victory by saying "It is no use fighting against men who have right on their side." Sir George Colley's unfortunate attempt had been as unnecessary as it proved to be disastrous, for Sir Evelyn Wood was already marching northwards with a considerable force to relieve and supersede him. Further reinforcements which were sent brought up the number of troops to 12,000, and Sir Frederick Roberts, who had distinguished himself in Afghanistan, was sent out from England to take command.

Meanwhile, however, political agitation had arisen in England, and attempts were made to convince the English statesmen that the annexation of the Transvaal had been a false step. The British Government, putting aside all thought of prestige and empire, instructed Sir Evelyn Wood to suspend hostilities. General Roberts arrived at Capetown to find that an armistice had been agreed upon at the instance of the Hon. Mr. W. E. Gladstone, then Prime Minister of England. Soon afterwards the terms of peace were signed at Pretoria. The people of the Transvaal regained their independence subject only to the suzerainty of the British Crown, control being restricted to the foreign relations of the Republic. Three years later, in 1884, a convention was signed in Lon-

COMMANDANT-GENERAL JOUBERT,

as he appeared in the field during the hostilities of 1880-81.

don in which the title of the State was altered from the Transvaal to the South African Republic, and the western boundary was clearly defined. The preamble of this Convention for some reason omitted all mention of British suzerainty, an omission which in later years became a fruitful source of dispute in the discussions preceding the war between England and the Boer Republics.

The Triumvirate continued in office for more than a year after the ratification of the Convention, Dr. Jorissen being reinstated in the office of Attorney-General, and Mr. Kotze in that of Chief Justice, the Rev. S. J. du Toit of the "Patriot" newspaper being appointed Superintendent-General of Education, and Mr. Ed. Bok as State Secretary. Paul Kruger was eventually elected President, Piet Joubert Commandant-General, while Pretorius, the other member of the Triumvirate, retired on a pension. The policy of the new Government and Volksraad was very reactionary in its character. Industrial monopolies were granted, and trade with England and her colonies was in every way discouraged.

Throughout the years 1882–3 there was general disorder on the western border of the Transvaal. Massouw and Moshette, two chiefs who were allied with the Boers, were pitted against Mankoroane and Montsiao, who had sided with the British in the war. White adventurers were engaged on either side, and these being rewarded for their services with grants of land endeavoured to set up two independent republics, one under the name of Stellaland, and the other under the name of the Land of Goshen. The British Government interfered, and held the Government of the Transvaal in a great measure responsible for what was going on. Under the new Convention the territories of Moshette and Massouw were placed within the limits of the Republic. Later in the year the country on the western side of the Transvaal border was proclaimed as being under the protection of the British Crown, as a means of putting an end to the disorders which still

LUCAS MEYER

(formerly "State President" of the "New Republic").

prevailed, and after being occupied by a strong military force under the command of Sir Charles Warren it was subsequently annexed under the name of British Bechuanaland. This expedition of Sir Charles Warren's was the result of the apparent contempt with which the republican authorities had treated all claims put forward by the British. The course of affairs since the retrocession had tended greatly to impoverish the Transvaal. In 1884–5 the finances of the State were at such a low ebb, and the burghers were so discontented with their lot generally, that the stability of the Republic was greatly impaired. Dissension again appeared among the leaders. General Joubert resigned his office of Commandant-General, and Dr. Jorissen was replaced in the office of Attorney-General by Mr. Leyds. The President fell more and more under the influence of the Hollander party, and the ardour of the Africander party at the Paarl, in Cape Colony, began perceptibly to cool, as it became clear that the colonials would be passed over in favour of Hollanders for all Transvaal appointments. The salaries of the officials fell into arrear, the treasury was behindhand with other payments, the farmers could get nothing for their produce, and the mutterings of discontent were growing louder every day, when an event occurred which gave a new turn to the course of affairs. The Sheba gold reef was discovered in the South Kaap: seekers after fortune from all parts of South Africa flocked to the Transvaal, the exchequer was replenished, the Government gained new heart, and the continued independence of the country was assured. A new township, Barberton, sprang up in the Kaap with marvellous rapidity, only to be eclipsed by a city of larger proportions and still more wonderful growth, when, in the latter part of 1886, the auriferous wealth of Witwatersrand began to attract adventurers by the thousands to that portion of the Transvaal. Prospectors now began to swarm over all parts of the country, with the result that gold was soon ascertained to occur in payable quantities from Komati on the east to Malmani on the west, and from Marabastad in the north to Heidelberg in the south. The Transvaal, in fact, was proved to be one of the richest mineral countries on the face of the globe.

This new aspect of affairs caused the Government once more to direct its attention to the feasibility of obtaining communication with the outer world by way of the natural port of the country—Delagoa Bay—and in the early part of 1887 it had the felicity of seeing the Portuguese section of the line seriously taken in hand. The Government subscribed largely to the capital of a German company registered at Amsterdam, formed for the purpose of extending the line from the Portuguese frontier to Pretoria and beyond. With a view to encouraging this enterprise President Kruger entered into negotiations with the Free State, and promised pecuniary aid to that Republic from the overflowing funds of the Transvaal, if they would forbid the extension through the Free State of any Cape Colony line for a period of ten years. The Free State was further asked if it would enter into a political union or

An early photo of

DR. W. J. LEYDS,

formerly State Secretary of the South African Republic.

into an offensive and defensive alliance, thus reviving the negotiations abandoned twenty years before. With these objects in view, being duly empowered thereto by the Volksraad, President Kruger, in October, 1887, paid a visit to Bloemfontein, when the Volksraad of the neighbouring State was in special session. His mission was not attended with success, but the disclosure of his aims made in the course of the negotiations, his evident wish to isolate and injure the British colonies, and his manifest purpose to obtain the means of coercing, if need be, the digging population—now more numerous in all probability than the Boer element itself—served greatly to irritate the diggers. The same causes also alienated the sympathies of moderate men both in the Cape Colony and the Free State, and convinced the Imperial Government that countermeasures were urgently required for the assertion of British influence in South Africa. Despite these sinister measures, perhaps because of them, President Kruger at the end of his term of office was re-elected by an overwhelming majority over his only rival, Commandant-General Joubert, though it must be remembered that the majority of the Europeans could exert no influence on the election, and still less could the native population. Notwithstanding the failure of the Bloemfontein Conference above referred to, the President was unceasing in his endeavours to bring about a closer union, political and commercial, with the Free State. Meetings of the burghers favourable to this aim were held at several places in the Free State itself.

The death of President Brand hushed politics for a little while; but, as the new President of the Free State was Chief Justice Reitz, a most ardent politician and republican, there was a better chance for the adoption of the Kruger policy than there would have been under the restraining influence of his predecessor. After sundry negotiations it was arranged that the two Presidents should meet at Potchefstroom, and at that place there was signed on the 9th March, 1889, what was afterwards known as the treaty of Potchefstroom. There were really two treaties. The first provided that the two Republics should consider each other's interests in regard to railways; the treaty of amity and commerce provided for reciprocal treatment of the burghers of the two Republics; and the political treaty (so called) bound each State to assist the other when the independence of either State was threatened or assailed from without. This was far short of President Kruger's ideas, and the question of Federal Union was indefinitely shelved.

In 1889 the work of the session of the Volksraad was not important, all matters of vital moment being either left secretly to the Government or shelved in the Volksraad for one year. The death of Colonel McMurdo (who had been intimately associated with the concession for the building of the Delagoa Bay line, in connection with which there had been some dispute) was announced in May, but made no difference whatever to the railway policy of the Transvaal. From a statement submitted to the Raad at a

later stage of the session it appeared that in one year and a half the country had lost by the Netherlands Concession a sum of £136,854, and by 1893 it was calculated that, should the Government wish to acquire the railway, it would cost £2,744,247, whereas a State railway would have cost only £1,406,250. The so-called Boksburg tramway—practically a railway—which was built along the Witwatersrand reef, to bring coal to the gold mines, for which a concession was granted in July, 1888, was virtually completed. This was called a tramway because President Kruger would not agree that any railway should be made until the completion of that to Delagoa Bay, which he considered essential to the independence of the country. This concession was secured under a clause which gave the concessionaires the priority in railway construction within the Republic. The estimate submitted to the Raad set down the probable revenue of the financial year at £1,328,728. The activities of the members were principally devoted to the expenditure of this large sum. The salary of the President was increased to £8,000 a year, the President having brought the question before the Raad by applying for a loan of £7,000, on the ground that his salary did not suffice for the maintenance of his official position. The pay of the members of the Volksraad was increased to £3 a day, and the salary of non-official members of the Executive raised to £1,200, and that of the State Secretary to £1,500. The Raad devoted £20,000 to the establishment of a college in Pretoria, known as the "Staats Gymnasium," and also resolved to found a Deaf and Dumb Institute. The Dual Chamber scheme was approved, but ordered to stand over for a year. In the early part of 1890 the first census was taken, and the totals arrived at showed that the uitlanders, or persons of foreign birth, resident in the Republic, closely approximated to the number of the Transvaalers. This was put forward as a justification of the demands of the former to a larger share in the government of the country than had been conceded them, or would be conceded them under the provisions of the Dual Chamber Bill.

L. P. BEZUIDENHOUT
(Fieldcornet, 1880-81).

The farm previously owned by this Boer has been laid out as a suburb of Johannesburg ("Bezuidenhout Valley"), adjoining Doornfontein.

In the month of March, 1890, His Excellency the High Commissioner and President Kruger met at a Conference at Blignaut's Pont, on the colonial side of the Vaal. The objects of this Conference were to consider matters of mutual interest to the Transvaal and South Africa at large, and if possible to arrive at an understanding with reference to railway construction, claims of British subjects in the Transvaal, and the future of Swaziland. At that Conference the proceedings were conducted in a most friendly spirit on both sides. All opposition to the extension of railways into the Transvaal was practically abandoned by the President, and important concessions to the wishes of the new-comers were promised, in return for certain undertakings on the part of the Imperial Government with regard to the future of Swaziland. The journey of the President to the place of meeting was marked by demonstrations which gave rise to feelings that threatened to render any amicable agreement between the High Commissioner and the President impossible.

Fortunately the President did not allow any private feelings to which those demonstrations gave rise to influence his better judgment. In passing through Johannesburg he met with a reception which was far from being friendly and cordial. He was expected on his arrival there to address the inhabitants, and to give expression to his views upon the railway and other questions which had agitated the public mind. A great crowd, numbering fully 10,000 persons, met him upon his arrival, but the short speech which he made to them was of so unsatisfactory a nature as to give rise to an indescribable uproar. The masses who thronged the streets became very disorderly, and some indiscreet rowdies tore down the national flag from the front of the Government offices, and with some show of violence besieged the residence of the Landdrost, where the President was staying. The perpetration of this outrage on the flag gave rise to strong feelings on the part of the burghers who were escorting His Honour. This unauthorised assembling of armed men for a time threatened to break the peace, but the "flag incident" was denounced by the more respectable portion of the inhabitants, and happily it ended with the arrest of several persons accused of the offence, who, however, upon trial at Pretoria were acquitted, the evidence adduced against them being insufficient to secure a conviction.

J. N. BOSHOF
(Treasurer-General, South African Republic).

At this period the Government was convinced that railways could no longer be delayed, and that the burdens and disabilities placed upon the mining industry and the people engaged in it must be lightened. Accordingly the Volksraad sanctioned the immediate commencement of railway construction to join up with the Cape line which came *viâ* Bloemfontein. The Raad, however, could not be induced to make any substantial concessions with regard to the claims of the mining industry.

While the Raad was in session a new convention for the future government of Swaziland was in process of negotiation, the Hon. J. H. Hofmeyr, M.L.A., of the Cape, having proceeded to Pretoria to assist in the negotiations. The Imperial Government was represented by the High Commissioner's military secretary, who was understood to have in his possession definite instructions for declaring Swaziland a British protectorate, and for the occupation of it should the Transvaal Government refuse to agree to the terms proposed. A strong police force had in the meantime been raised in Natal, by command of the High Commissioner, to assist in maintaining British authority there. The mission of Mr. Hofmeyr and his efforts to induce the Transvaal to accept the terms proposed were entirely successful, the convention being affirmed by the Raad as one of its last acts that year. The chief provisions of the convention were that the joint government of Swaziland was to continue. The Republic gave up all its rights to enter into treaties with the natives to the north and north-west, so avoiding rivalry with the Chartered Company, promised not to oppose railway extension from Natal, and also undertook to assist as far as possible the Chartered Company in the north. The convention was at first opposed both in and out of the Raad, but it was seen that there was nothing for it but acceptance of its provisions or a British occupation of Swaziland, and the position was accepted with as good grace as possible. The Swazis also acquiesced in the British proposals, and when the period of mourning for the late King Umbandine expired, the office of installing his successor Bunu was proceeded with.

The depression which followed upon the period of company-promotion and mad share speculation which the years 1888 and 1889 witnessed partially depopulated Johannesburg, and led to much distress and the ruin of many. This continued for the next two years, and was only alleviated by the greater attention that was given to the development of the mines. Companies with good prospects were put upon a more satisfactory footing, badly-managed and worthless companies went to the wall, and the capital of many others reduced which had previously been on a too highly-inflated basis. Thus the industry was placed in a fair way of becoming a profitable one.

During 1890 and 1891 the revenue which had risen so rapidly in the few preceding years just as rapidly fell away again, and retrenchment was the cry all round. The Boers in the country districts, however, were in a greater state of affluence than ever before.

C. J. JOUBERT
(formerly Minister for Mines, South African Republic).

Large sums had been paid them in the "boom" days for options on their farms, on the chance of the properties being mineralised, while they had reaped enormous sums from transport-

MR. ISAAC VAN ALPHEN
(formerly Postmaster-General, South African Republic).

riding, the slow and cumbersome ox-wagon being still the only means of bringing goods up from the railway termini in the Cape Colony, Natal, and the Orange Free State. In the towns the distress was very acute, and many who were unable to find the necessary funds with which to get away from Johannesburg and the Rand literally starved to death. The Government was committed to heavy expenditure from which it could not escape, and in order to tide over its financial difficulties borrowed money from Home financiers at a ruinous rate of interest. All this time the mining industry was being placed on a sound foundation, and, on the advice of the best experts in the world, capital was practically poured into the country.

Politically the period that ensued was marked by an undisguised aggressive activity on the part of the Transvaal Government. The Executive gradually opened up a consistent and untiring campaign of spoliation and irritation of the uitlander, with the gold industry as its chief objective. The Government and the officials appeared to have one axiom and rule of conduct—that was to regard the uitlander as an interloper, to be tolerated only so long as he was a source of profit. To be a non-burgher was to be a mere cypher, and the humiliation was rendered the more complete by the fact that the officials who had the administration of the laws vied with those who designed them in making them operate as harshly as possible. In 1895 a petition was sent to the Raad from the Rand bearing over 35,000 signatures, asking for the extension of the franchise on terms both modest and reasonable. The debate on it in the Raad gave the members an opportunity to express their hatred of, and unqualified hostility to, the uitlander, and the petition was rejected with sneers and insults. But it was the subservience of the High Court to the will of the Executive that rankled most, and created a feeling of grave mistrust in the more thoughtful and far-sighted. Case after case was decided which seemed to prove that no one was likely to benefit by a judgment in his favour, if the decision was likely to clash with the interests of the authorities.

The best known and perhaps most important of these cases has passed into history as the "Brown Case." The point of this case was as follows: A certain farm was legally proclaimed a gold field, and a day appointed when the public could go and peg claims. On the eve of the pegging the Executive discovered that certain claims

already pegged and assigned to the President and his nominees by the owner of the farm were, under the Gold Law, peggable by the public. A hasty resolution by the Executive annulled the proclamation in order to afford time for the readjustment of the difficulty in favour of the President. An American named Brown and others refused to acknowledge the legality of the postponement of the pegging, and pegged the claims. They sued the Government to compel it to grant transfer, and the judgment of the High Court was in favour of the peggers. The Executive refused to obey the order of the Court, and passed a resolution which in effect ordered the Judges to acknowledge the right of that body to annul the constitutional law. The Judges meekly accepted the order with the exception of Chief Justice Kotzé (now Judge-President of the Eastern Districts Court in the Cape Colony), who, refusing to endorse so gross an infringement of the constitution, was dismissed. Although the sequel to the Brown Case did not develop till later, it was this audacious attempt to poison the fountain of justice that roused the active opposition of uitlanders. The thoughtful regarded the future with alarm, and lent a ready ear to projects for alleviation which emanated from the National Union. These thoughts and aspirations were very fairly expressed in the famous manifesto which formed the charter of the party that later on became known as the Reformers. It is somewhat strange that the very important indictment of the Government in regard to its attempt to tamper with the Courts of Justice never seemed to appeal to the masses so acutely as the question of representation and the franchise. Recognising this, the leaders of the Reform movement not unnaturally emphasised the franchise point, and made it the main objective of their propaganda, though competent judges strongly maintained that the bulk of the uitlanders were indifferent to the matter. In the autumn of 1895 the ceremonial opening of the new building of the Chamber of Mines was taken advantage of by Mr. Lionel Phillips (then President of the institution) to make a speech that was remarkable not so much because of its outspokenness as for the fact that it was the first emphatic protest against the Transvaal Government. It is now known that at this time arrangements were in full progress for the rising which eventuated in the Jameson Raid, and that that speech was intended as a "trial balloon" to test the trend of popular feeling. It not only tested but helped it, for it gave the crowd a hint that the financiers who had so far studiously avoided identifying themselves with active opposition to the Government were sympathetic. The Secretary of the Reform Committee (now Sir Percy Fitzpatrick) has told the world in a book published after the Jameson Raid that the Reformers were satisfied that it would be an easy matter to rouse public feeling to the extent of getting a sufficient number to rise in open rebellion and seize the arsenal at Pretoria, and probably the members of the Executive and the President himself. Having done this much they relied upon the intervention of the British Government to avert bloodshed and to put the finishing touches to the work. The force under Dr. Jameson was to be in readiness on the border to march in to assist the movement at the critical moment. A public meeting was called for the 6th January, but this was a "blind," as according to the secret programme the rising was to have taken place two days earlier. It is agreed by those qualified to form an opinion that the affair was mismanaged, and the incursion of Dr. Jameson altogether upset the plans of the Reformers. This view has been the subject of some bitter and acrimonious discussion, but the general effect left on the mind of the impartial observer is that those who endeavoured to organise the rising had a vague idea that by making a demonstration of force in Johannesburg backed up by the force from Rhodesia they would compel the Pretoria Government to climb down and grant the bulk of the concessions demanded. This supposition was apparently justified, for on the very day that Jameson started on his march, December 31st, 1895, the Government issued an order suspending the import duty on all foodstuffs. Later knowledge has shown that the Reformers were fairly outwitted and bluffed by the astute President, and that they entirely overrated and misunderstood the conditions they thought were in their favour, and they were certainly not aware of the preparedness on the other side. The Government apparently knew of the secret importation of arms, and it is a matter of record that the invasion by Jameson did not come as the surprise it was intended to be. The provisions for the rising in Johannesburg were woefully inadequate. The Reform Committee only possessed 3,000 rifles with which to arm their supporters, and even the 1,500 men expected to come in with Jameson proved to be considerably less than half that number. The result was inevitable. After a futile skirmish outside Krugersdorp, Jameson's force turned off at a right angle to the south, and staggered and stumbled all night among the mines in the endeavour to find a road to Johannesburg. Ten thousand burghers were by this time sufficiently near to bar Jameson's progress, and the final collision took place at Doornkop. After having about twenty killed and forty wounded Jameson was obliged to surrender to the Boers, who were under Cronje, later of Magersfontein and Paardeberg fame. The Boers took their prisoners to Krugersdorp, and on the following day, January 3rd, they were sent to

J. G. KOTZÉ,
as a Judge of the South African Republic.

(In consequence of the Volksraad of the Republic overriding certain decisions of the High Court affecting uitlanders, Judge Kotzé protested and resigned. Now Judge-President of the Eastern Districts Court of the Cape Colony.)

Pretoria. The capture of Jameson caused consternation in Johannesburg, where little doubt had existed of the ability of the raiding force to get through. The town had for a week been under the control of the Reform Committee, who on the whole were fairly representative of the wealth and intelligence of the Rand. The Committee had organised a town police, the Government having early in the trouble withdrawn its own civil police, and some 6,000 men had been enrolled to fight. The news that Jameson had crossed the border threw the Committee into a state of alarm

and disorganisation, which became something approaching a panic when they were reluctantly compelled to admit that Jameson and his force were prisoners. Sir Jacobus de Wet, H.M. Agent in Pretoria, visited Johannesburg and prevailed upon the people to lay down their arms quietly, holding out as an inducement the assurance that the British Government would see their wrongs righted. In the after days considerable discussion arose as to the exact promises made, but what they were mattered little, as the Boers were complete masters of the situation. The arms were handed over to the police, and a week later all the members of the Reform Committee were arrested and lodged in gaol at Pretoria on a charge of high treason. The trial took place on April 27th, the prosecution being conducted by Dr. Coster, the State Attorney, who singularly enough was the first man on the Boer side killed at Elandslaagte in the subsequent war. The Judge was Mr. Justice Gregorowski (of the Free State), who was specially requisitioned to try the case. The result was a foregone conclusion. The four leaders—Col. Frank Rhodes, and Messrs. L. Phillips, George Farrar, and J. H. Hammond—were sentenced to death, and the remainder to two years' imprisonment and a fine of £2,000. The Chairman of the National Union, Mr. Chas. Leonard, who had signed the manifesto, managed to escape from Johannesburg before the arrests were effected, and went to England. The death sentence passed on the leaders was commuted, and in the May following the Reformers were liberated on their undertaking to take no part in Transvaal politics for three years. The four leaders had to pay a fine of £25,000 each before obtaining their liberty. Messrs. "Karri" Davies and Woolls-Sampson refused to accept the President's magnanimity, but were released in Jubilee year as an "act of grace." There is no question that the immediate results of the Jameson Raid were disastrous to the cause of the uitlander. The Government made it the excuse for the enforcement of every repressive measure on the statute book, and proceeded to inaugurate a political espionage department on a scale the magnitude of which will probably never be really known. The Government also built forts at Pretoria and Johannesburg, increased their armaments to a tremendous extent, and in short spared no pains to show that the Boer no longer regarded the uitlander in any light but that of an enemy within his gates who might at any moment assail him, and against whom the most sleepless precautions were necessary. There is little doubt that the leniency meted out to Dr. Jameson and his officers at their trial in London, where they had been sent after having been handed over to the

DR. A. E. J. KRAUSE,
as State Prosecutor, South African Republic.

British Government, and the result of the Select Committee to inquire into the alleged complicity of Mr. Rhodes in the Raid, did not tend to allay the hostile feeling of the Boers. That Committee practically exonerated Mr. Rhodes, and from the Pretorian point of view justified the assumption that the attack on the independence of the Republic had the sympathy of the Imperial Government. Meanwhile the President had addressed a letter to the uitlanders, in which he expressed his desire to "forgive and forget," and in recognition of this assurance the Executive in 1898 consented to the appointment of an Industrial Commission whose professed object was to inquire into the grievances of the uitlander so far as they affected the industries of the country. The report was distinctly favourable, and for the time gave great satisfaction, as it lent an appearance of genuineness to the Government's profession of a desire to assist and not retard the gold industry. But results soon proved that the inquiry was a mere blind, and like the judgments of the High Court that were distasteful to the "powers that be" could be easily nullified. The debate which took place in the Raad on the report satisfied the uitlander that the old Adam of uncompromising hostility was as much alive as ever, and beyond the fact that it gave an opportunity for airing many grievances in an orderly and systematic manner the time of Commissioners and witnesses, to say nothing of the heavy expense, might well have been spared, for nothing came of it. Matters assumed their old and objectionable form. Concessionaires swarmed in Pretoria, and the illicit liquor syndicate flourished in spite of a quadrupled special detective force. Fortunes were made out of the traffic in stolen raw gold from the mines, and one or two sensational prosecutions elicited the fact that the Government officials under the pretence of trapping offenders were themselves buying and misappropriating gold. The dismissal of Chief Justice Kotzé had created a profound impression both in the Old Country and South Africa. An Association which had been started in Capetown as the exponent of Imperialism formed a branch in Johannesburg and excited at once the hostility of the Government—and with reason, for as the result showed this organisation proved a powerful and potent instrument in bringing about the great change that subsequently occurred. Public feeling was rarely left any time in which to grow cool. Event crowded on event. Corruption, scandals, Government defiance of High Court judgments, ill-

P. J. CRONJE
("Fighting General" during the 1880-81 war), afterwards—in the last war—of Paardeberg fame.

treatment of Cape boys, a reign of terror in Johannesburg owing to the inability of the police to cope with the criminal element, these kept public interest alive, until the last straw was added in the shape of the much-quoted "Edgar case." Edgar, a respectable mechanic, having had an altercation with a policeman at midnight, retired to his house, where he was followed by the policeman, a man named Jones, who on the door being opened shot Edgar dead in the presence of his wife. The case was only a trifle more outrageous than many that had preceded it, but what stirred the public was the extraordinary steps taken by the authorities to shield the murderer. He was charged only with manslaughter, and released on the ridiculously small bail of £200. Judge Kock, who presided at the trial of Jones, actually used the expression, "Well done, policeman!" A petition to Her Majesty asking for intervention on behalf of the lives and liberties of her subjects was drawn up by the South African League, and largely signed, and a meeting of the public was held on the Market Square to take the petition to the British Consul. For holding this meeting Messrs. Clem Webb and T. Dodd were arrested and committed for trial under the Illegal Meeting Law, bail to the amount of £1,000 each being demanded. The striking contrast in the bail—£200 for the criminal and £1,000 for those who protested against the crime—made a great impression on the public mind, and helped the flowing stream of unrest and indignation. When the trial of Jones resulted in an acquittal the verdict of the jury was endorsed by the juvenile Judge Kock with an expression of a hope that the police would never fail to do their duty under similar trying circumstances, a direct and injudicious incitement which the police were not slow to take advantage of. After many rumours and much discussion it became known that a Conference between President Kruger and the High Commissioner (Sir Alfred Milner) had been arranged, and on the first day of June, 1899, the parties met at Bloemfontein. Whatever other subjects may have been included in the programme of the discussion, they all gave way to the question of the franchise. Sir Alfred held out for an irreducible minimum of a five years' qualification for burgher right, the President would concede nothing beyond seven, and after a week's talk a deadlock occurred, and the Conference, from which much was expected, broke up without result. It is now pretty generally believed that the President went prepared for what actually happened, and was fully resolved upon war. The months of July, August, and September were occupied in the exchange of despatches between the two Governments. From the first Mr. Chamberlain took a firm and decisive attitude in his demand for the redress of the grievances of the uitlanders. Although less explicit and dignified in language, the despatches of State Secretary Reitz were equally emphatic to those familiar with the methods of Pretorian diplomacy, and a settled feeling that war was inevitable became widespread. Early in September the exodus from Johannesburg began, and continued at a rapidly growing rate until the resources of the railway were exhausted

EX-GENERAL PIET CRONJE, 1903. (Mr. Cronje is shown standing in front of his house near Klerksdorp.)

and the refugees were packed in open coal trucks and subjected on the journey to the frontiers to horrors which will take years to efface from the memory of the victims. The unrelenting attitude of the Boer Government, taken with the warlike tone of the Boer press, justified the British Government in taking the precaution of moving such troops as were in Natal closer to the border. This gave the Boer Government an excuse for coming to closer quarters, and they demanded to know the reason for the presence of troops so near to their borders. They received the reply that they were there for purely defensive purposes. Pretoria retorted by sending commandoes to Volksrust (within fifteen miles of the Natal border), and on October 9th an ultimatum was addressed to the British Government demanding the withdrawal of the troops within 24 hours. The Pretoria Government also demanded an undertaking from the British Government that troops then *en route* from India and England should be sent back. The ultimatum was ignored by the British Government, Mr. Conyngham Greene (the British Agent) was recalled, and on the 11th of October the Transvaal commenced hostilities by sending a commando into Natal. The Orange Free State having thrown in its lot with the Transvaal (a probability on which there had been some doubt and discussion), the issue became clear, and the war at the very outset assumed its true character as a struggle for supremacy in South Africa between Briton and Boer. Quite unprepared for such a Titanic struggle, the English forces at the outset met with a series of severe disasters. Ladysmith, Kimberley, and Mafeking were besieged, and the forces originally thought sufficient to cope with the Boers were found to be altogether too small. In the hour of adversity volunteers offered from every colony and dependency in the British Empire. Finally Lord Roberts was appointed to the chief command, with Lord Kitchener as his chief of staff. Then came the turn of the tide. Kimberley was relieved by General French on February 15th, 1900, and twelve days later—to be exact, on February 27th, the anniversary of the disastrous Majuba—Cronje, with about four thousand Boers, had to surrender to a superior force under Lord Roberts at Paardeberg. The same month saw the relief of Ladysmith, and Lord Roberts, marching from Paardeberg, entered Bloemfontein on March 13th. The month of April was comparatively uneventful, as Lord Roberts had to remain in the Free State capital to make arrangements for his great forward movement to the north. This was commenced on May 5th, and very little opposition was shown to the British advance. Reaching the Vaal River on the 28th May, Lord Roberts issued a proclamation annexing the Orange Free State to the British Crown, and on the same day crossed the Vaal River and entered the Transvaal. There was little fighting along the line of route, and no serious attempt was made by the enemy until the 29th, when something approaching stubborn resistance was manifested on the south-east of Johannesburg as a preliminary to the surrender of the town. Not a shot was fired from the dreaded fort, a few

isolated and disorganised Boers carried on a running fight in and about the mines of the East Rand, but there was no battle, and on the last day of the month Lord Roberts was able to write a despatch announcing the surrender and occupation of the city which had for eight anxious months been the objective and Mecca of soldier and civilian alike. The advance on Pretoria was opposed in a half-hearted manner by General Louis Botha, but his force was evidently dispirited, for the fighting was of the running and rearguard order. The nearest approach to a pitched battle took place at Six Mile Spruit, where there was some sharp fighting on the 4th June, but there was no pause in the irresistible forward movement. President Kruger had abandoned his capital before the surrender of Johannesburg, despite his boastful assurance that he would be found on his stoep when the English arrived. A sort of emergency committee of those of the leading burghers who remained decided not to defend the place, and on June 5th the Transvaal capital was entered and the British flag hoisted on the Raadzaal. On September 18th, 1900, Lord Roberts issued a proclamation announcing the annexation of the Transvaal, and with that the "official war" may be said to have ended. The runaway President had made his headquarters at Machadodorp, a wayside station on the Delagoa Bay Railway, where with his companion in misfortune (ex-President Steyn of the Free State) he governed his lost country from a railway carriage, though his energies appear to have been more seriously devoted to the issue of paper money and the consignment of bullion to the safe keeping of his agents at Delagoa Bay. As the British approached Machadodorp he retreated to Waterval Onder, a station yet nearer Delagoa Bay, and being ousted from there went north in the direction of Lydenburg, whence on the 10th September he suddenly left for Lourenço Marques, his flight being covered by an official declaration that he had obtained six months' leave of absence to visit Europe. Mr. Kruger died in Switzerland in 1904, without returning to South Africa. Lord Roberts towards the end of 1900 relinquished the command to Lord Kitchener, and the Boers adopting guerilla tactics the fighting was continued until the middle of 1902, but on the 31st of May the Boers then in the field surrendered and accepted British rule. The High Commissioner of South Africa, Lord Milner, meanwhile had come up from Capetown and assumed the Governorship of the Transvaal and Orange River Colony, and once hostilities were concluded active measures were taken to place the country in a prosperous condition and repair the ravages of war. Sir Arthur Lawley came from Western Australia to take up the position of Lieut.-Governor of the Transvaal Colony, and a Legislative Council was appointed to remain in office during the period of Crown Colony government. Mr. Chamberlain visited South Africa at the end of 1902, and during his stay in Johannesburg came to an arrangement with mining and commercial representatives for a thirty millions contribution towards the cost of the war. All the efforts to place the mining industry on a sound footing similar to that existing before the war were now retarded by the scarcity of native labour, and a proposal emanated from the heads of the large mining houses that the shortfall of labour should be made up by importing Chinese coolies. This at first met with the strongest opposition from the general public. A Commission was appointed to inquire into the whole question of native labour, and the requirements of the Mining Industry, the Railways, the Government, and Agriculture. Expert evidence from all over the country was called, and the concensus of opinion adduced therein was to the effect that there was not sufficient labour available in the country to meet the requirements. A Bill was then introduced into the Legislative Council to authorise the

THE RIGHT HON. FREDERICK SLEIGH, EARL ROBERTS, V.C., P.C., K.G., K.P., G.C.B., O.M., G.C.S.I., G.C.I.E.

importation of Chinese coolies to work in the mines, and after a good deal of opposition in some quarters this was passed and became law. Not, however, before there had been strenuous opposition from the Liberal party in England. The results of the system of Chinese labour after a substantial test may be regarded as successful; captains of the industry have even gone so far as to say that the importation of Chinese has been the saving of the industry and the country from financial ruin. In May, 1903, the Intercolonial Council of the Transvaal and Orange River Colony was established. It was created principally in order to avoid again breaking up the Central South African Railways into two systems. The system had been worked as one during the war, and to split it was obviously a retrograde step. There were other reasons which made the existence of some Council common to the two Colonies necessary, such as the problem of apportioning the guaranteed loan to the two Colonies. In addition the Council forms a starting point for any schemes of amalgamation whether they concern the Transvaal and Orange River Colony only or the other Colonies of British South Africa also. Early in 1905 the British Government announced that representative government was to be granted the Transvaal, the first elections to take place in 1906. There had been a strong movement in favour of complete responsible government, but the British Government decided that the time was not yet ripe for this. In April, 1905, Lord Milner resigned as Governor of the Transvaal and Orange River Colonies, and the High Commissionership of South Africa, and the Earl of Selborne (who had been First Lord of the Admiralty) was appointed in his place. Lord Selborne entered the Transvaal in May, 1905, and immediately assumed the duties of his high office. He was well received by all sections of the community, a formal reception taking place in Johannesburg on the 26th May. His early speeches in reply to addresses of welcome created an excellent impression. His Excellency's decision in making a tour throughout the country and mixing freely with its inhabitants still further strengthened the feeling of goodwill towards him which had been created on his entry into the country. Sir Arthur Lawley, K.C.M.G., who was appointed Lieutenant-Governor of the Transvaal in August, 1902, was called to the governorship of Madras in November, 1905. The general satisfaction expressed at Sir Arthur Lawley's promotion, combined with the sentiments of regret at his departure, showed how highly the work he had done in the Transvaal during his term of office had been appreciated by the entire community.

LORD KITCHENER'S STAFF, PRETORIA May 31st, 1902.

Constitution and Parliament.

THERE is a generally prevailing impression that, on the cessation of the Boer War in 1902, the onus of the entire re-construction of the social fabric devolved at once upon the shoulders of Lord Milner. This is hardly in accordance with actual facts, and it is scarcely possible to give a correct account of the resumption of civil administration without first giving a brief sketch of the work inaugurated for the benefit of, and handed over to, the civil arm, by the military authorities in the Transvaal and the Orange River Colony. Military rule can never hope to be popular, with its arbitrary dealing, its abrupt decisions, its intolerance of remonstrance and disregard of the rights of individuals, but, admitting all that, and more, it must still be conceded that, since the days of Julius Cæsar, no conquering army has ever undertaken and accomplished such an amount of public work as that carried on by the forces in South Africa under Lord Roberts and Lord Kitchener. Beyond the salaries and allowances attached to semi-civil appointments, the army as a whole has had but little acknowledgment of these newly-adopted duties and responsibilities—unless, indeed, the record of bitter abuse and personal vituperation may be reckoned such; yet, on eliminating the personal feeling induced by personal idiosyncracy and circumstance, the fact stands out in bold relief that the indebtedness of the civil administration to the military organisation has never been very plainly stated to the world. To assume that, at the time of the Vereeniging agreement, Lord Milner entered upon the Governorship of a land wrecked to the naked hull, sans offices or officials, or administrative machinery, is an erroneous view; and it might surprise those who have entertained this opinion to learn that throughout the military occupation, the railway and post and telegraph services were never discontinued, however little they might have been allowed to minister to the wants of the general public; town and district police were organised, courts sat for the administering of justice, Crown prosecutors and Crown solicitors, legal and financial advisers, were appointed to the staffs of the military governors, the public health

REPATRIATION DEPÔT AT MIDDELBURG.

regulations were improved and enforced, health officers and district surgeons had been appointed in all the larger centres, police magistrates, customs officials, a receiver of revenue, marriage officers, commissioners for native affairs, the liquor licence department, railway station-masters (called railway staff officers), and a host of other civil functionaries, held the ordinary civil fabric in place. Mining operations re-commenced shortly after the departure of Lord Roberts: the South African Constabulary was recruited in 1901; the Volunteer movement was afoot in the form of a Witwatersrand corps known as the Rand Rifles; veterinary surgeons had commenced their researches and were struggling with rinderpest and a host of other ills; military dairy, stock preservation, and agricultural farms had been organised between the Rand and Potchefstroom, and in the Pretoria district; and last, but by no means least, the formidable equipments of the Civil Supplies and the Burgher Camps departments simplified to an enormous extent the work of repatriating the surrendered Boers. These provided transport, provisions, truckage, and many experienced officials, and were also called in to help the cause of education, and land settlement. That the pioneer work of the army needed regulating, re-organising, and expanding, is clear from the nature of things; but it existed, and from these foundations rose the later structure which will last when the work of those who laid the first stones shall have been forgotten. From the time of the occupation of Bloemfontein until the signing of the terms of peace these labours had been pushed forward perseveringly along the railway lines and wherever else practicable. The public offices in Pretoria, Johannesburg, and Bloemfontein teemed with hard-working staffs, recruited not only from the army, the yeomanry, and the irregular corps, but also from the burgher population and from refugees, allowed—in rare cases—to return from their involuntary sojourn at the coast towns. In the country districts it was of course otherwise; the wearisome continuance of petty warfare made any sort of administration impossible; but it must at the same time be borne in mind that there was very little of the machinery of civilisation at any time to destroy in the country districts of the Transvaal. Farms were burnt, but the foundations remained; local stores were closed, post-carts were no more, and other means of transport there were none. But the only real devastation was in the destruction and capture of stock, and the waste of a season's crops and a season's sowing. What has never been, cannot be "re-constructed"; and much of the immense work done by the civil powers since the restoration of peace has been work that has never been attempted before, in the territories north of the Vaal. The security of the capital and the Rand was so complete, that in the autumn of 1900 Lord Milner paid a flying visit to the Transvaal, returning in the early months of the next year to establish his staff permanently in Johannesburg. He brought his private secretaries, Imperial secretary, financial adviser, auditors, and other clerical assistance, and he was accompanied and followed by a number of gentlemen, who, although their appointments were not formally made until some months later were destined to hold the most important posts under the new administration. These gentlemen were: the financial adviser, Mr. (afterwards Sir Richard) Solomon, who was to be Attorney-General; Sir Godfrey Lagden, destined to be Commissioner for Native Affairs (whose experience in Basutoland inspired confidence in his ability to grapple with this always difficult question, into which he plunged immediately on his arrival on the Rand); Mr. Wybergh, who had been President of the uitlander association known as the South African League, and who was later the first Commissioner of Mines; and others who were entrusted with more or less important interests. Lord Milner succeeded Lord Roberts in the autumn of 1900 as Administrator of the two new Colonies, and was formally appointed to the office of Governor and Commander-in-Chief in August, 1901, but did not actually take up the duties of the position until June, 1902. During the year that elapsed, an enormous amount of re-organisation work was carried out or prepared for; the civil courts were first taken over, and judges appointed; the Transvaal Town Police, horse and foot, a very fine body, completely organised, were handed over to the administration by the military; the *Government Gazette* and the Government printing works were re-started; the auditing of the civil revenue collected by the officers in charge of those departments was begun; the Public Works and the Education departments took shape and form; irrigation, bacteriological research, forestry, game preservation, the expansion of the existing hospital, gaol, asylum, and orphanage accommodation, and many other matters that never before in the history of the country had been undertaken in a really earnest manner, were all discussed and in many cases organised on a permanent basis. An enormous amount of work was carried on, under difficulties of every description, of which the exigencies of military operations was not one of the least; but

REPATRIATION OFFICES, FOURTEEN STREAMS.

BRANDING REPATRIATION CATTLE, KHAMA'S COUNTRY.

though the mass of work accomplished before the conclusion of peace must be reviewed before it can be realised or credited, it must be borne in mind that throughout this period the real work of administering the country was done by the Headquarters Staff and the officers of Lord Kitchener's army. In the early days of Lord Milner's residence in the Transvaal he appointed a small body of gentlemen to form an Advisory Committee to help him in dealing with the constant and conflicting demands and claims of the aforetime uitlander community, which not only comprised the loyal British, and alien, sections of the population of the Rand and Pretoria districts, but was mainly composed of the commercial and industrial bodies, and who therefore had huge interests in jeopardy. The formation of an Executive Council, composed of the chief members of the administration, put an end to the necessity for this advisory body. The Permit Committee also removed its headquarters from Capetown to Johannesburg, and proceeded with the task of dealing with the rush of applications for permission to return to the country; and a little later on, at the urgent instance of the influential British, German, and other residents, who had been fortunate enough to obtain permission to resume their business, another committee came into being, the Refugees' Aid Committee, for the purpose of assisting indigent refugees both British and alien, then living in extreme distress in ill-found camps and other miserable quarters at the coast towns, to return to their homes and occupations, or to husbands who had already found work or appointments. Thus were the towns gradually re-peopled, and the work of Imperial expansion inaugurated. In June, 1902, Lord Milner took over the sole control of the two Colonies, and the Executive Council was formally and officially appointed to the task of advising the Governor. It was composed of the Colonial Secretary, the Colonial Treasurer, the Attorney-General, the Commissioners of Mines and Native Affairs, and the Director of Education. In the September

COUNTING REPATRIATION CATTLE AT SHASHI.

following, Sir Arthur Lawley was appointed Lieutenant-Governor of the Transvaal, and a Legislative Council came into being, formed of the members of the Executive Council, and other members of the Government added thereto. These new members included the Commissioner of Lands and Director of Education. Later still, in 1903, this body was greatly increased, so as to include a number of the representative men of the capital, the Witwatersrand, and the more important provincial districts. These appointments were purely nominative and in no sense elective, and, while they outnumbered the official members by some two or three, their total was not sufficiently large to make any serious change in the policy sketched out by Lord Milner. That they were able to render infinite assistance in framing laws that affected the commercial interests of the country is beyond question. The debates of this Council were fully reported in the daily press and in the Hansard of the Colony. In the autumn of the year 1902 Lord Kitchener and the army of occupation disappeared from the scene, and the country was freed from the incubus of feeding and maintaining, quartering and transporting, so vast a number of persons; and the enormous strain of repatriating the burgher population remained in the hands of the administration. Many officials, both military and civil, were taken over from the Burgher Camps Department, and were of infinite value on account of their experience and knowledge of the people.

MOB OF CATTLE, REPATRIATION DEPARTMENT, PALAPYE.

It may be interesting, before proceeding further with an account of the Legislature, to give a sketch of the work which had to be done by the Repatriation Department, which came into existence for the sole purpose of replacing the burgher population of the land. The Articles of Surrender required the return of the Boers to their farms at the earliest possible opportunity, the urgency for their rapid return being greatly increased by the necessity for getting the men back in time to prepare the ground and sow mealies (one of the staple products of the country) by October and November. The repatriation was

essentially a temporary organisation, hurriedly called together to deal with an emergency, and in consequence was much more expensive than it

BRANDING MADAGASCAR CATTLE AT PRETORIA REPATRIATION DEPÔT.

otherwise would have been. But to those who are always complaining of the cost of re-settlement, anyone who knew the conditions of things at this juncture would reply that the rapidity with which the work was carried out was marvellous, and that the expenditure was by no means so wasteful as is generally supposed. The difficulties and the magnitude of the task can only be realised by those who have seen a country devastated by war, with large numbers of men thrown on its resources through the disbanding of innumerable local and oversea corps. Some of these men were absorbed by the Repatriation depôts, where they thankfully accepted work: others found refuge in the Constabulary, while the Public Works, the railways, and the other branches of the public service accounted for many more, as well as for many of the employés of the military administration. But there remained of necessity a large and helpless residue, as the mining industry was not yet fully "on its legs," and not working at its full strength. Apart from prisoners of war, the concentration camps in the Transvaal and Natal contained over sixty thousand of the population of the country, and these camps were notified to hold themselves in readiness to receive such of the returning and surrendering Boers as should have no immediate shelter or means of subsistence. A large number thankfully availed themselves of the privilege and rejoined their families for a short period in the camps. Those who wished to at once seek their homesteads were provided with one month's rations for themselves and families, tent accommodation, and wagon transport, and mealies and seed potatoes for planting. The camps were not finally emptied until six months later, and it is difficult to imagine what organisation would have been able to have proved equal to the situation had not this merciful scheme been in existence. It is a fact deserving of emphasis that during this very trying period, when much angry feeling might have been expected and excused, not one case of serious misconduct, insubordination, or insolence to the officials is on record. Lord Milner took over much of the equipment and transport as it existed, although until the evacuation of the country by the troops it was never wholly adequate to the demands made upon it. To those unacquainted with the Transvaal it may be necessary to explain that the means of transit and communication for this vast army of workers, as well as the supply of the commonest necessaries for the welfare of the population who were being restored to their homes, was dependent on cartage by road from the few lines of railway intersecting the country. Off the railway the land was entirely depleted of stock, and was a howling wilderness. Many small prosperous towns, such as Ermelo, Carolina, and others, were simply a mass of ruins. The material for rebuilding as well as food and other equipment for temporary purposes, to be transported by ox and mule wagon at a time when starvation, disease, and slaughter had reduced the stock resources of the land to the lowest ebb, would have been a heavy strain for any department in any country. The number of people to be dealt with was also remarkable, as large numbers of families had taken refuge in the towns and had to be assisted back to the land. Others, in destitute circumstances, were sent in from the outlying districts by Resident Magistrates to receive relief supplies, and eventually became the charge of the Repatriation Department. Over forty depôts existed as distributing centres, each in charge of a superintendent with sufficient staff to enable him to carry out the duties devolving on his particular centre. In conjunction with the working organisation of the department, arrangements were made by which Advisory Committees were appointed in each magisterial district, consisting of the Resident Magistrate and several of the prominent residents. These Committees were to inquire into the needs of the people in their respective districts, and

MOB OF REPATRIATION CATTLE, KHAMA'S COUNTRY.

to advise the Repatriation Department with regard to the nature and quantity of material—*i.e.*, foodstuffs, building material, agricultural implements, seeds, transport animals, and vehicles which they considered should be issued to the farmers. Orders issued by

A TRANSPORT WORKSHOP, REPATRIATION DEPARTMENT, PRETORIA.

these local Committees were handed to the superintendent of the district depôt, whose duty it was to see that the issues were made and correctly accounted for. In addition to the issues to the burghers, the department, as has been already stated, supplied all the Government departments with their means of transport and in many cases with their means of subsistence, as in the case of the Education Department, which was dependent on them for the rationing of school children at all their provincial schools, as well as for the cartage of material for the erection of their buildings.

In 1903 the Inter-Colonial Council was appointed to control such matters as were common to both the new Colonies, the most important being the Railways, the South African Constabulary, and the Surveys, and the expenditure connected with each of these points. This body was formed from members of the Transvaal administration nominated by the Governor, members of the Orange River Colony administration nominated by the Lieutenant-Governor of that Colony, and members of the Legislative Councils elected from amongst themselves. It sits alternately in the Transvaal and the Orange River Colony. The Legislative Council, which at first partook of the nature of a Cabinet Council, was soon enlarged, and the public was admitted to a share in its deliberations. An alteration in the existing gold law and the introduction of a new diamond law were contemplated, and it was very wisely decided that in matters so widely concerning the interests and development of the country the Government should be assisted by the advice of persons possessing the confidence of the public. A generous number of unofficial members were admitted to the sittings of the Council by the nomination of the Governor, the number of the heads of departments being at the same time increased, and all shades of opinion were represented. It is interesting to note at this juncture that the leaders of the Boer people declined to aid with their advice the councils of the nation. The enlarged assembly met for its first session on May 20th, 1903, at the capital, and sat until July 30th. Much sound legislation was inaugurated, the standing laws of the country being altered, amended, improved, and added to, so as to bring them up to the requirements of a rapidly increasing urban population. The new diamond law, the Precious Stones Ordinance, was introduced by the Attorney-General and passed, the revenue gaining an immense advantage in establishing a right to 60 per cent. of the profits from all newly-discovered diamond properties. Such a source of profit to the revenues of the country could not be discarded, in view of the enormous and hitherto unsuspected riches of the diamondiferous deposits in the Transvaal, as revealed by the working of the Premier Mine, discovered since the war. At the same session the Attorney-General introduced an ordinance to regulate the trade in diamonds, to protect the industry from the raids of the illicit diamond-buyers. This Act is on the same lines as that of the Cape Colony, and is commonly referred to as the I.D.B. Law. The members of the first Legislative Council were: the Lieutenant-Governor, Sir Arthur Lawley; Mr. Davidson, C.M.G., Colonial Secretary; the Honourable Sir Richard Solomon, K.C., K.C.M.G., Attorney-General; Mr. Patrick Duncan, Colonial Treasurer; Sir Godfrey Lagden, Commissioner for Native Affairs; Mr. Wybergh, Commissioner of Mines; Dr. Jameson, Commissioner of Lands; Mr. J. Frank Brown, Postmaster-General; Lieutenant-Colonel Fowke, Public Works Department; Mr. J. W. Honey, Director of Customs; Mr. F. Ware, Director of Education; Mr. H. Weldon, Mining Engineer to the Government; Mr. Fox Symons, Medical Officer of Health for the Transvaal; Lieutenant-Colonel H. M. Jackson, R.E., for the administration; and Sir Percy Fitzpatrick, Sir George Farrar, and Messrs. F. F. Bourke, J. C. Brink, A. P. J. Cronje, J. Z.

REPATRIATION OFFICES AND QUARTERS ON A GRAZING FARM, SWAZILAND BORDER.

de Villiers, T. Everard, R. K. Loveday, W. Hosken, H. C. Hull, P. Roux, A. S. Raitt, F. B. Smith, H. Solomon, H. P. F. J. van Rensburg, and Daniel

EX-GENERAL ANDRIES CRONJE,

Chairman of Repatriation Commission, Potchefstroom district.

Ward, K.C., LL.D., for the public. Mr. G. Craig Sellar was clerk to the Council, and Mr. C. E. Hawes assisted him in his duties. The second sitting of the Legislature was from December 7th, 1903, to February 12th, 1904. This might be described as a stormy session, two most bitterly controversial measures coming before the Council for decision. The mine-owners and the mining community generally, in despair at the shortage of native labour and the uncertain quality of native work at all times, reverted to an idea that had been mooted before the Jameson Raid—namely, the importation of unskilled indentured labour from China or British India. It is impossible to give an adequate idea of the storm that raged round this question both inside and outside the Council Chamber. The Bill was introduced by Sir George Farrar—the recognised leader not only of the mining industry, but of the loyal and progressive party throughout the Transvaal, a man of great business ability and courageous convictions; and after heated discussion in Council, and still more heated meetings in Johannesburg and all along the Rand, where feeling ran high and scenes of wild disorder occurred; after the presentation of innumerable petitions, both for and against the measure (the most important being one presented by Sir George himself, on behalf of the mining industry, with over 45,000 signatures), the Bill to introduce Chinese indentured labour became law. The Attorney-General also introduced the Precious Metals Draft Ordinance, which after prolonged discussions was withdrawn to await the advent of representative government. An Ordinance providing for the census of the people, both European and native, was introduced by the Colonial Secretary, and this important undertaking was carried out successfully with scarcely a hitch in the working arrangements. At this session the resignations of the Colonial Secretary and the Commissioner of Mines were announced. Mr. Duncan, the Treasurer, assumed the position of Colonial Secretary, Mr. Weldon taking his seat as Acting Commissioner of Mines in the place of Mr. Wybergh. The third session lasted from June 23rd to August 17th, 1904, Mr. Hiehens taking his seat as Colonial Treasurer, and Mr. Duncan remaining as Colonial Secretary. Mr. Ward and Colonel Fowke tendered their resignations also. The Public Education Ordinance was introduced and was adopted; a Bill called the Medical, Dental, and Pharmacy Act, to regulate the sale of poisons and to deal with the proper registration of medical and dental practitioners, became law; and other ordinances were also passed dealing with rabies, leprosy, and plague—the latter placing large powers in the hands of local plague committees to enable them to cope with an alarming outbreak of this dangerous disease. An ordinance was passed to assist and encourage in the formation of Volunteer corps throughout the Transvaal; and the attention of the Government was drawn to a judgment of the Supreme Court, deciding that the individual tenure of land by natives was not opposed to the true interpretation of the law as it stood under the late Government. This decision was not popular, and the Government was requested to legislate on the subject: but a wise and firm decision was arrived at, that it was impossible for the Government to impose disabilities on His Majesty's subjects to which they had not hitherto been subjected, and this resolution was adhered to. The Marriage Law, the Gaol Law, and the criminal procedure code were altered and amended, and a Bill carried for the better administration of justice. Most of these important improvements in the existing law were introduced by the Attorney-General and the Colonial Secretary. The Council assembled for a fourth extraordinary session on the matter of granting municipal franchise and elective appointments of councillors to the capital and the chief towns of the Transvaal, and to increase the powers of the Pretoria Municipality. This business was settled on October 12th, 1904, and Dr. Turner took his seat as Medical Officer of Health for the Transvaal. The fifth sitting of the Council took place in 1905, from July 8th to October 2nd, when Mr. Curtis took his seat as Assistant Colonial Secretary for Urban Affairs, and Colonel Jackson and Messrs. Ware and Van Rensburg tendered their resignation. The Commission of Lord Selborne to be His Majesty's High Commissioner in South Africa and Governor of the Transvaal was read. During the prorogation, Lord Milner's retirement from office had been announced, and the close of his public career was adorned by the grant of a constitution, which bestowed repre-

BOERS AND THEIR RUINED HOME,

Rheboksfontein, Klerksdorp district.

sentative government on the Colony in a form that has been recognised as the most liberal and generous that has ever been given to new and undeveloped territories. The constitution provides for the retention of the Inter-Colonial Council with its control of the railways and the constabulary, the appointment of the Executive by the Governor, and further decides that the future native policy is to remain in the hands of the Home Government. It provides for a Legislative Council of not more than thirty members, of which such members of the Executive

THE EFFECT OF SHELL FIRE ON A BOER HOMESTEAD,
Hartebeestfontein, Klerksdorp district.

as the Governor shall appoint form part. The unofficial members shall be returned by popular election to represent the various towns and electoral districts of the Transvaal, the Rand not to return more than twelve members, and the electoral districts to remain as much as possible on the lines of the old district divisions as they existed under the late Government. Members are to be allocated to each district on a basis of electorate, not population, the principles of "one man, one vote" and "one vote, one value" to be recognised. The qualifications for the franchise are (a) to have been registered as a burgher of the State on the Volksraad burgher rolls, (b) to be a British subject of over twenty-one years of age, or a naturalised alien of two years' standing in the country: the property qualification being receipt of a salary of £100 a year, or to own property of an equivalent value, or to pay rent of £40 a year. A Commission was arranged to be sent from England to go into the matter of the electoral divisions, and to delimitate them where necessary. These are the main features of the new constitution. It is impossible to give an idea of the vast amount of intricate and detailed work completed by the Legislative Council during its five sessions, nor the immense improvement in the laws resulting from the care and diligence with which questions were handled. Measures relating to town lands, the fencing of farms, stock theft, stock-branding, the naturalisation of aliens, the jurisdiction of Swaziland, the health of the public, gaols and prison discipline, legal matters and court procedure, prospecting and the proclaiming of mining areas, grazing, irrigation and water boards, riparian rights, land settlement and agriculture, bacteriologieal researeh, the question of the granting of trading rights to Asiaties, and a host of matters equally important to the welfare of the public, have engaged the attention of the Government, and in most cases have been legislated for; and many of the old laws have been so amended as to bring them into line with those of other progressive communities. Commissions were in some cases appointed to hold inquiries with a view to supplying the administration with reliable data, and of these the most important were the Commission to inquire into the supply of native labour, the Commission to inquire into the native question generally, with a view to securing some uniformity in the legislature all over South Africa, Commissions to inquire into the financial relations of the Colony, Commissions to inquire into the status of the coloured people and Asiatics and to define their position, to investigate the Swaziland concessions, and to report upon the Civil Service, upon the conditions and accommodation in the prisons of the Colony, and upon the health of the indentured labourers in the Rand mines. The proceedings of

FARMHOUSE DESTROYED DURING HOSTILITIES,
Buisfontein, Klerksdorp district.

the Legislative Council have been throughout characterised by dignity and restraint, members, whether British or Dutch, displaying a correctness of demeanour and an amount of good feeling, public spirit, and devotion to duty, which must surely constitute a record. Those who have followed the course of the debates cannot fail to realise what future generations will owe to the enlightened rule and the patient labours of the Legislature of the Transvaal under the Lieutenant-Governor in Council, since the Boer war of 1899–1902.

His Majesty's Representatives in the Transvaal Colony.

ALFRED, first Viscount Milner, who was raised to the peerage in 1901, is the son of Charles Milner, M.D., and Mary, daughter of Major-General Ready, Governor of the Isle of Man. His early education was conducted in Germany, where his parents resided. Subsequently he proceeded to King's College, London, and to Balliol. His career at Oxford was brilliant, and he became a Fellow of New College. In 1881 he was admitted to the Inner Temple, and afterwards engaged in journalism. During this part of his life he was on the staff of the *Pall Mall Gazette*, and had relations of the most cordial character with Mr. Stead and Mr. Leopold Grahame, whose names are so well known to South Africans. In 1885 he unsuccessfully contested the Harrow division in the Liberal interest, and in 1887 became private secretary to Mr. Goschen when the latter was Chancellor of the Exchequer. At the close of Mr. Goschen's term of office, Mr. Milner was appointed Under Secretary for Finance to the Government of Egypt, and he remained in that country from 1889 until 1892, displaying the same striking aptitude for finance that had distinguished him under his former chief. At the close of his term of office in Egypt he published a book entitled "England in Egypt"—a work as opportune as it was able, and a substantial factor in the rather acrimonious discussions which centred round the British occupation of Egypt. From 1892 to 1897 he was Chairman of the Board of Inland Revenue, and in 1895 became Sir Alfred Milner, K.C.B. When the South African question became acute, as the result of the Jameson Raid and the subsequent developments of Boer policy, Sir Alfred Milner was chosen to be Her Majesty's representative, and he landed at the Cape of Good Hope as High Commissioner for South Africa and Governor of Cape Colony in 1897. War was declared by the South African Republic in 1899, and the new century was ushered in by two years of harassing warfare, during which time Sir Alfred Milner maintained a Constitutional Government at Capetown. In 1901 he was created Baron Milner, proceeded to the Transvaal with his staff, and took up his residence in Johannesburg, in the early part of the same year. On being relieved of his duties as Governor of Cape Colony, he was appointed to the Governorship of the Transvaal and the Orange River Colony, assuming the title of Viscount Milner. In 1902 Lord Milner took over the administration of the two new

VISCOUNT MILNER, P.C., G.C.B., G.C.M.G.,
formerly High Commissioner for South Africa, and first Governor of the Transvaal.

Colonies from the military authorities, and after three years of arduous and uninterrmittent labour—at the end of which period he assisted the Home Government to draft and grant a liberal constitution for the Transvaal—he retired from his official position in South Africa. He is now a Director of the London Joint Stock Bank. Lord Milner, during the latter part of his South African career, was exposed to the severest adverse criticism that has ever assailed a Governor by those who were opposed to his policy. The "storm of obloquy" that beat upon his head did not in any way, however, shake the "inenrable optimism" which he boasted, nor alter by one jot the policy laid down by him for the settlement of South Africa. The salient features of Lord Milner's administration as High Commissioner from 1897 to 1905 were his quiek perception of the menace to British supremaey, the abortive Conference with President Paul Kruger at Bloemfontein in 1899, the astonishing feat of ruling by constitutional methods a Colony distraeted by rebellious risings under a Ministry in sympathy with the rebels, the determination to make no useless concessions to anti-British feeling, and the strenuous efforts to induee a settled British population, both rural and urban. Lord Milner has left an indelible mark on the page of South African history which it was his to turn. As a publie speaker he has furnished the nation with household words whieh will not readily be forgotten by the present generation.

THE EARL OF SELBORNE, P.C., K.C.M.G.

Captain the Hon. Sir Arthur Lawley, K.C.M.G., late Lieutenant-Governor of the Transvaal Colony, and now Governor of the Provinee of Madras, is the fourth son of the second Baron Wenloek, and brother of the present peer. He was born on November 12th, 1860, and married in 1885 Annie Allen, daughter of Sir Edward Cunard, the seeond Baronet. Sir A. Lawley held a commission as eaptain in the 10th Hussars, but in 1892 relinquished his regimental duties and became private seeretary to the late Duke of Westminster. At the elose of the Matabele rebellion, when Earl Grey sueeeeded Dr. Jameson as Administrator of Rhodesia, Captain Lawley aceompanied the new Administrator to the Chartered Company's territories, and in 1890 was appointed Administrator of Matabeleland. Many diffieult and anxious questions as to future settlement were then distraeting the Rhodesian settlers, and Captain Lawley by his taet and wisdom exercised a most beneficial influence in the new territory north of the Transvaal. In the early part of the Boer War Captain Lawley rendered great assistance to the eolumns operating in the northern distriets, and was knighted in 1901 for his serviees in Matabeleland. He was next appointed to the Governorship of Western Australia, when he accompanied their Royal Highnesses the Prinee and Princess of Wales on the Royal yaeht *Ophir* as far as Albany. He did not make any long stay at the Antipodes, for he was shortly re-ealled to assist Lord Milner in the task of organising the new administration of the Transvaal. During his term of office as Governor of Western Australia, however, his ability, together with his tact and kindliness, so endeared him to the eolonists that he became the most popular Governor that had ever represented His Majesty in that State. He was ably seeonded in his high position

by Lady Lawley, who will ever live in the memory of the West Australians as their ideal of Anglo-Saxon womanhood. Sir Arthur Lawley returned to South

THE HON. SIR ARTHUR LAWLEY, K.C.M.G., first Lieutenant-Governor of the Transvaal.

Africa in September, 1902, and was Lieutenant-Governor of the Transvaal until August, 1905, holding the office of Acting High Commissioner in the interregnum between the departure of Lord Milner and the arrival of Lord Selborne. While in South Africa he established his reputation as an eloquent and fluent orator, his power of graceful speech being first revealed at a banquet in honour of the opening of the railway from the Cape to Bulawayo. The Administrator on that occasion occupied the place which it had been expected would be filled by Mr. Rhodes, and in the presence of representatives from every important centre in South Africa, Pretoria alone excepted, he delivered a speech which earned for him the title of "silver-tongued." Sir Arthur Lawley's later career in South Africa as Lieutenant-Governor of the Transvaal was marked by arduous and incessant work, undertaken in a fearless, impartial spirit that merited recognition at the two great banquets held to bid him farewell. One of these functions took place in Pretoria, the other in Johannesburg. Both were attended by Briton and Boer alike, and served as an opportunity for one of those outbursts of true eloquence which almost invariably graced Sir Arthur's public utterances. While Lord Milner had been profoundly immersed in Imperial problems having for their goal the federation of the Colonies of South Africa, Sir Arthur Lawley had been daily involved in a mass of legislative construction of a most intricate description, that entailed laborious thought and concentration; and it is easy to believe that, to use his own rather pathetic phrase when bidding farewell to his regiment of Volunteers—the Northern Rifles—"Of leisure, since I came to the Transvaal, I have had absolutely none." In spite of administrative toil and all other preoccupations, Sir Arthur was immensely popular in Pretoria—where he resided—and his high qualities were thoroughly appreciated. Though other Governors come and go, and win fame and golden opinions, the memory of the charming personality of the first British Lieutenant-Governor of the Transvaal will not readily pass from the minds of those who were proud to call themselves his friends. It is a curious coincidence that Sir Arthur Lawley's brother, Lord Wenlock, should have occupied the position of Governor of Madras, which Sir Arthur has now left South Africa to fill.

William Waldegrave, second Earl of Selborne, P.C., G.C.M.G., is the second British Governor of the Transvaal Colony, and the present High Commissioner for South Africa, in succession to Lord Milner. He is the son of the first Earl of Selborne and the Lady Laura Waldegrave, daughter of the eighth Earl Waldegrave. He became Viscount Wolmer in 1883, and

SIR RICHARD SOLOMON, K.C.M.G., C.B., K.C., Acting Lieutenant-Governor (Attorney-General).

in 1895 succeeded to the estates and title of his father, an eminent lawyer, and Lord Chancellor of England from 1872 to 1874 and from 1880 to 1885

LADY LAWLEY.

In 1883 Viscount Wolmer married the Lady Beatrix Maud Cecil, daughter of the third Marquis of Salisbury, by whom he has three sons and one daughter. Lord Selborne was educated at Winchester, and at University College, Oxford, where he took a B.A. degree. From 1882 to 1885 he was private secretary to the Secretary of State for War and Chancellor of the Exchequer, the Right Hon. H. C. E. Childers. From 1885 to 1886 he sat in the House of Commons as Liberal member for East Hampshire. He joined the ranks of the Liberal Unionists in 1886, and represented West Edinburgh from 1892 to 1895. From 1895 to 1900 he was Under Secretary of State for the Colonies to Mr. Chamberlain, and in 1900 became First Lord of the Admiralty, in which position he inaugurated many useful reforms. His experience at the Colonial Office during the stirring days of Mr. Chamberlain's tenure of office, coupled with the fact that he is a *persona grata* with both the great political parties, marked him out as a most suitable successor to Lord Milner, and in 1905 he was welcomed with acclamation as High Commissioner for South Africa and Governor of the Transvaal. In his new position he appears to have struck the right note from the start, and his careful, well-informed speeches, his sympathetic attitude towards all classes of the population, and the lofty patriotism which he consistently upholds, have earned the confidence of the majority of South Africans.

THE EXECUTIVE.

Sir Godfrey Lagden, K.C.M.G. (Commissioner for Native Affairs).

H. Weldon, Esq. (Acting Commissioner of Mines).

Dr. A. Jameson (Commissioner of Lands).

P. Duncan, Esq., C.M.G. (Colonial Secretary).

The Hon. Sir Richard Solomon, K.C.M.G., K.C.B., K.C., Acting Lieutenant. Governor of the Transvaal (Attorney-General).

[*The photograph of Mr. W. L. Hichens, M.L.C. (Colonial Treasurer), was not available when this work went to press.* —ED.]

LEGISLATIVE COUNCIL.

1. Mr. J. E. Adamson, M.L.C. (Director of Education); 2. Mr. E. F. Bourke, M.L.C.; 3. Mr. J. C. Brink, M.L.C.; 4. Mr. J. F Brown, M.L.C. (Postmaster-General); 5. Mr. A. P. J. Cronje, M.L.C.; 6. Mr. J. Z. de Villiers, M.L.C.; 7. Mr. T. Everard, M.L.C.; 8. Mr. J. A. S. Bucknill, M.L.C. (Commissioner of Patents); 9. Mr. F. B. Smith, M.L.C. (Director of Agriculture); 10. Sir Percy Fitzpatrick, M.L.C.; 11. Mr. H. C. Hull, M.L.C.; 12. Mr. P. Roux, M.L.C.; 13. Sir George Farrar, D.S.O., M.L.C.; 14. Dr. G. Turner, M.L.C. (Medical Officer of Health for the Transvaal); 15. Mr. H. Solomon, M.L.C.; 16. Mr. A. S. Raitt, M.L.C.; 17. Mr. R. K. Loveday, M.L.C.; 18. Mr. W. Hosken, M.L.C.

[*The photographs of Mr. J. W. Honey, M.L.C. (Director of Customs), and Mr. B. Windham, M.L.C. (Secretary for Native Affairs), were not available when this work went to press.* —ED.]

The Hon. Sir Richard Solomon, K.C.M.G., C.B., K.C., Attorney-General of the Transvaal, comes of a distinguished legal family of the Cape Colony, all the members of which are more or less well known to the South African public. Sir Richard was born at Capetown in 1850, and was educated at the South African College, Capetown, and at St. Peter's, Cambridge. He was called to the bar and admitted to the Inner Temple in 1879, and in 1881 he married Elizabeth Mary, daughter of the Rev. John Walton, of Cape Colony. In 1886 he accompanied the late Lord Rosmead—then Sir Hercules Robinson—as legal adviser on his mission to inquire into the affairs of the island of Mauritius; and in 1893 was returned for Tembuland at the Cape elections for the House of Assembly. After the abortive Jameson Raid, when the Reform leaders were on trial in Pretoria, Mr. Solomon was retained for the defence in conjunction with Mr. Advocate Wessels. In 1898 he held office under Mr. Schreiner, and guided the counsels of that stormy Ministry until the return to power of Sir W. Gordon Sprigg, when he became legal adviser to Lord Milner in the early days of the Transvaal administration and re-construction. He was appointed Attorney-General to Sir Arthur Lawley's Executive in 1902, and was Acting Lieutenant-Governor during Sir Arthur's absence on leave, and later in 1905–6 after Sir Arthur Lawley had left to take up his duties in India. He is a member of the Executive and Legislative Councils of the Transvaal, and of the Inter-Colonial Council; and also sat on the Commission to inquire into Native Law and Affairs. Sir Richard Solomon's father was the Rev. E. Solomon, who laboured as a missionary in the Transkei (Cape Colony). Sir Richard has systematically endeavoured to place the Native Law out of the swing of party politics. His daughter married Sir Percy Girouard, one of Lord Kitchener's ablest officers, who for some period held office in the Transvaal as Commissioner of Railways. The Attorney-General's residence is "Zasm House," Pretoria. He is a member of the Reform Club.

Transvaal Railways.

THE railways of the Transvaal, which since the conclusion of the Anglo-Boer war have been largely extended and developed, are included in the system known as the Central South African Railways, the administration of which controls both the Transvaal and the Orange River Colony. The commencement of railway construction in the Transvaal dates from the year 1890, when under authority of the Republican Government a single track first known as the "Rand tram" was laid to cope with traffic along the gold reef. In retrospect it is amusing to consider that this "tramway" from Boksburg to Krugersdorp when first projected in 1888 was opposed by some members of the old Volksraad as an "impious" undertaking! To-day many Transvaal Boers look upon railways in a totally different spirit to the old patriots who had seen the foundings of their State out of the wilderness. As the town of Johannesburg and the mines in the vicinity called for increasing transport facilities, sections were linked up as rapidly as practicable, so as to connect the railways of the State (then principally dominated by the Netherlands Railway Company) with those of the Free State, which were at that time worked by the Cape Government Railways, and in 1892 uninterrupted railway communication became effected between the Cape metropolis and Johannesburg. Finally, on the first day of 1893, the main Transvaal

VIEW OF PARK STATION, JOHANNESBURG.

line was finished to the capital, Pretoria. A section connecting Pretoria with the Portuguese port on the east (Delagoa Bay) had also been in progress during the early nineties, and was completed in November, 1894. On that section a branch line starting from Kaapmuiden junction was built to connect the De Kaap gold fields and Barberton. A third line from Germiston junction on the main line to the Natal border was put in progress, and was in full running by 1896. The Central South African Railways therefore comprise main trunks from Norval's Pont on the Cape border through the Orange River Colony and Transvaal as far north as Pietersburg, those connecting Natal with the Rand, and Delagoa Bay with Pretoria, in addition to other branches subsequently built. The railway lines taken possession of by the British military authorities (and known during hostilities as the Imperial Military Railways) consisted of the following:—

(1) The Orange Free State Government railways, originally built by the Cape Government, and taken over by the Free State.

(2) The Netherlands South African railways (N.Z.A.S.M.), constructed by a private company under a concession from and subsidised by the Transvaal Republican Government.

(3) The Pretoria-Pietersburg railway, built by a private company subsidised by the late Transvaal Government.

Prior to the war of 1899 the railways in the Transvaal were nearly all worked by the Netherlands Company, which controlled altogether 688 miles of railroads.

As evidencing the rapidity of development, it may be stated that while the end of 1890 saw only 166 miles of line completed, in October, 1899 (on the outbreak of hostilities) there was a length in all of 1,314 miles in the Orange Free State and Transvaal. Since the British occupation this has been considerably increased. The railway lines open for traffic on the 31st December, 1904, were:—Northern division, 505½ miles; central division, 506¾ miles; southern division, 507½ miles; and another length (Harrismith-Aberfeldy section) of 20¼ miles. The lines open for traffic during the twelve months (and included in the above list) gave a total length of 152½ miles—86 miles in the central division, and 66½ miles in the southern division. During 1905, in addition, railways under construction in various parts under the administration totalled a length of 403¾ miles; while, according to the General Manager's report for the year 1904 "railways projected but not actually under construction on the 31st December, 1904," amounted in all to a length of 711 miles. These, in addition to several smaller sections, include Machadodorp-Ermelo, Pretoria-Rustenburg, Krugersdorp-Mafeking, Bethlehem-Kroonstad, Modderpoort-Bethlehem, and Bloemfontein-Kimberley. When all these are opened the approximate length of the C.S.A.R. system will be 2,654¾ miles.

The lines in the Transvaal State controlled by the Netherlands Company prior to the war became vested in the Governor of the Transvaal Colony on September 1st, 1900.

11th CLASS AND 14-ton Z.A.S.M. ENGINE—A CONTRAST.

With regard to the actual cost of the main trunk lines of the present Central South African Railways, no information is possessed by the administration, these having been constructed under the old régime, and no statistics being available. Statements shown in the report of the present General Manager (Mr. T. R. Price, C.M.G.), however, indicate the capital value placed upon the 1,540 miles of line existing on the 31st December, 1904, as £21,404,851 (approximately a cost per mile of £13,899 5s.).

The Central South African Railways administration is controlled by a Joint Council consisting of representatives of both the Transvaal and the Orange River Colony. The members of the Inter-Colonial Council are *His Excellency the High Commissioner and Governor of the Transvaal (the Earl of Selborne, P.C., G.C.M.G., &c.), President; His Excellency the Lieutenant-Governor of the Transvaal (Acting Lieutenant-Governor, Sir Richard Solomon); His Excellency the Lieutenant-Governor of the Orange River Colony (Sir Hamilton Goold-Adams, K.C.M.G., C.B.); the Acting Inspector-General of the South African Constabulary (Lieutenant-Colonel R. S. Curtis, D.S.O., R.E.); the Attorney-General of the Transvaal (Sir Richard Solomon, K.C., K.C.M.G., K.C.B.); Messrs. *P. Duncan, C.M.G. (Chairman of the Railway Committee), *H. F. Wilson (Colonial Secretary of the Orange River Colony), *W. L. Hichens (Treasurer of the Council), A. Browne, I.S.O. (Colonial Treasurer of the Orange River Colony), Adam Jameson (Commissioner of Lands of the Transvaal), C. W. Palmer (Director of Agriculture, Orange River Colony), and *J. H. Meiring (Collector of Customs, Orange River Colony); *Sir Geo. Farrar, D.S.O., Sir Geo. Fraser; Messrs. E. F. Bourke, *W. Hosken, *R. K. Loveday, H. Solomon, W. Burns-Thompson, *Thos. Brain, *H. C. Hull, Johann Rissik, H. W. Stoekdale, and P. J. Wessels. The Secretary of the Council is the Hon. R. H. Brand*; Acting Secretary, Mr. P. H. Kerr*.

* Members also of the Railway Committee.

The Inter-Colonial Council meets generally twice yearly, either at Pretoria, Johannesburg, or Bloemfontein. The duration of its session depends upon the volume of business to be transacted. The meetings when held in the capital cities take place in the respective Legislative Council Chambers. The Railway Committee (which is a sub-division of the Inter-Colonial Council) usually meets each Friday, in the C.S.A.R. headquarter offices in Johannesburg, a handsome block recently completed which faces Park Station. The result of the labours of the Inter-Colonial Council has met with the approval of the general public. The only reservation to be made on this point is upon the all-absorbing question of rates, which are unquestionably high, and are a large factor in the economic question of the cost of living now obtaining in the Transvaal.

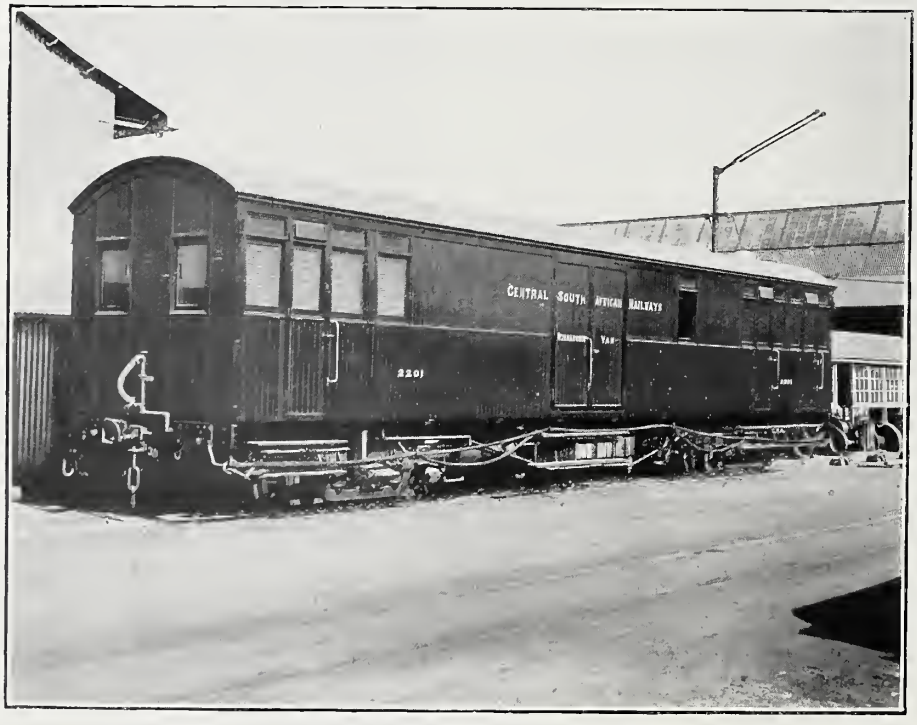
THE FINE BLOCK OF ADMINISTRATIVE OFFICES, C.S.A.R., near Park Station, Johannesburg.

The staff of officers and employés of the C.S.A.R. is selected as required from applications made by persons who have had railway experience in South Africa or on British or colonial railways. A Training Office which has been established has for its purpose the training of suitable youths of the country for railway work. It is intended to extend the scope of this experiment.

The number of employés in the service of the whole administration at the end of 1904 was officially given as 6,553 Europeans and 8,510 natives. Of these, 2,412 Europeans and 2,286 natives worked in the traffic department, and 2,663 Europeans and 1,748 natives in the locomotive department. Rates of pay received under the administration vary. Clerks are in receipt of salaries from approximately £200 to £500 per annum according to the class of work performed; senior officers from £500 to £1,300 per annum. Heads of the principal departments receive approximately £2,000 per annum. The wages of the daily-paid staff vary according to grade—from 7s. 6d. to 21s. per diem.

The question of quarters for employés has had and is receiving adequate consideration. During the year 1904 the scale of rent charges for railway houses was raised "with a view to removing certain anomalies which had existed when the rent was calculated on the value of the building occupied." One uniform system of fixing the rent according to the accommodation and class of building now prevails, rents being kept as low as possible consistent with a return towards payment of interest to the administration on the capital sunk in the buildings, after providing for maintenance and other charges. In the Low Country (Eastern Transvaal), where in parts malarial fever is more or less prevalent, it is interesting to note that much has been done towards combating fever. Station buildings and quarters east of Waterval Onder (Pretoria-Delagoa Bay line) are made mosquito-proof by means of gauze doors and windows.

An interesting experiment in the economies of this important railway



BREAKDOWN VAN, C.S.A.R.

administration may here be alluded to. A start has been made in the direction of planting trees of which the wood is likely to be suitable for railway sleepers. The plantation is on Government ground at Pan, and is under control of the Agricultural Department of the Transvaal. Four hundred acres were here placed under trees, and subject to funds being provided it is intended that a further similar acreage should be planted. It was recommended, in addition, that a sum of £5,000 be annually set aside for the ensuing ten years for the planting of trees, best suited to the soil and climate, "for use at the proper time as railway sleepers and for other railway purposes." At a conservative estimate it is conjectured that the value of the yield, at from 20 to 25 years from date of planting the trees, would be well over twenty-fold of the expenditure incurred. While this work of utilitarian importance has been considered in its place, the equally necessary work of improving the appearance of stations and cottages by planting fruit trees and shrubs is by no means overlooked. There were at the end of 1904 already 300,000 young fruit trees and other suitable trees growing at the railway nursery near Waterval Boven, to be transferred to stations and quarters when ready for transplanting.

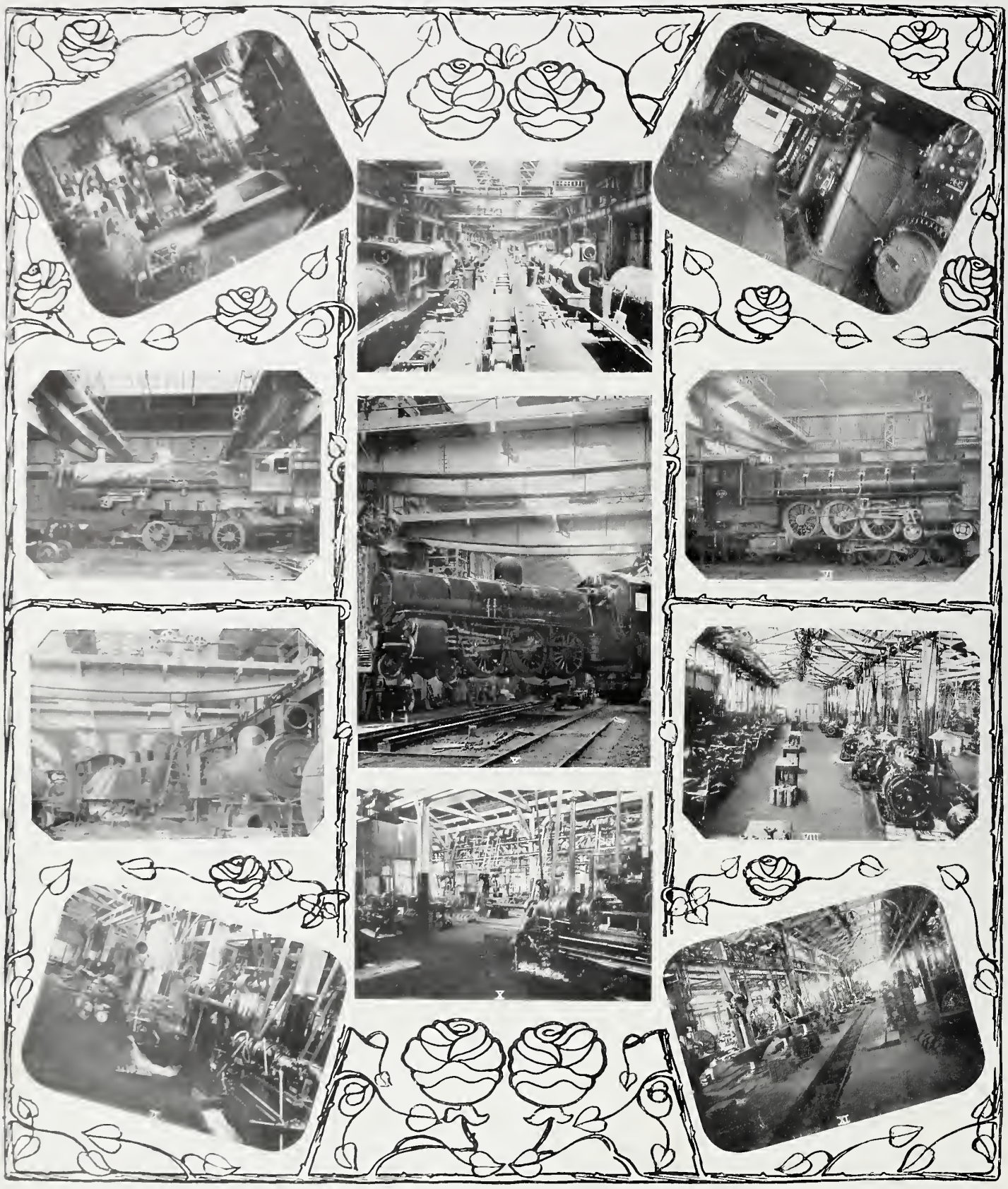
In the Johannesburg of to-day nothing more surprises the visitor after ten years' absence (or less) than the development which has taken place —concomitant with the marvellous influx of inhabitants—on the Rand railways. In addition to the central Johannesburg station, well-equipped and busy suburban and outside stations with their neat buildings and convenient offices exist for miles along the Reef in either direction—on the west to Krugersdorp: on the east to Boksburg. There is, needless to say, a sharp contrast—in the double track which spans this stretch of country, and the traffic which daily passes to and fro—to the original single-line "Rand tram," the wonderful innovation at which Boer patriots marvelled. In the period when the State railways were controlled by the N.Z.A.S.M. (Netherlands Railway Company), Park station, as distinguished from "Johannesburg" station, became the outlet for passenger traffic. This has now developed into the principal and central station of Johannesburg. Here the through mail trains are despatched, and incoming passengers from the distant Colonial ports and from Delagoa Bay alight. Park station is the largest and busiest railway station in the Transvaal Colony — indeed, in South Africa. This station is situated about half a mile from the market square, on the north side of the town, and occupies all the ground between Noord-street and Hancock-street. The principal entrance is from the former street. The station is approximately 1,145 ft. in length from one end of the platform to the other. There are four lines of rails carried through, and the various platforms are reached by means of three over-bridges, one at each end of the station and one in the centre. The usual offices required in a large terminus, including booking office, baggage, Customs rooms, and bicycle shed, are conveniently arranged near the main entrance. On the centre or "island" platform are to be found the remaining offices, all of which are well fitted and spacious. The block to the west of the central waiting space comprises the cloak room, dining, and refreshment rooms, and that on the east side the stationmaster's office, lavatories, and the general and ladies' waiting rooms, very comfortably furnished, where tea and light refreshments can be obtained. The centre platform is spanned by a fine ornamental iron roof, extending the greater part of its length, and the side platforms by smaller ones. Big alterations are proposed in connection with the following important stations:—Pretoria, Germiston, and Braamfontein (Johannesburg).

The following new sections of line in the Transvaal were opened for traffic during 1905:—

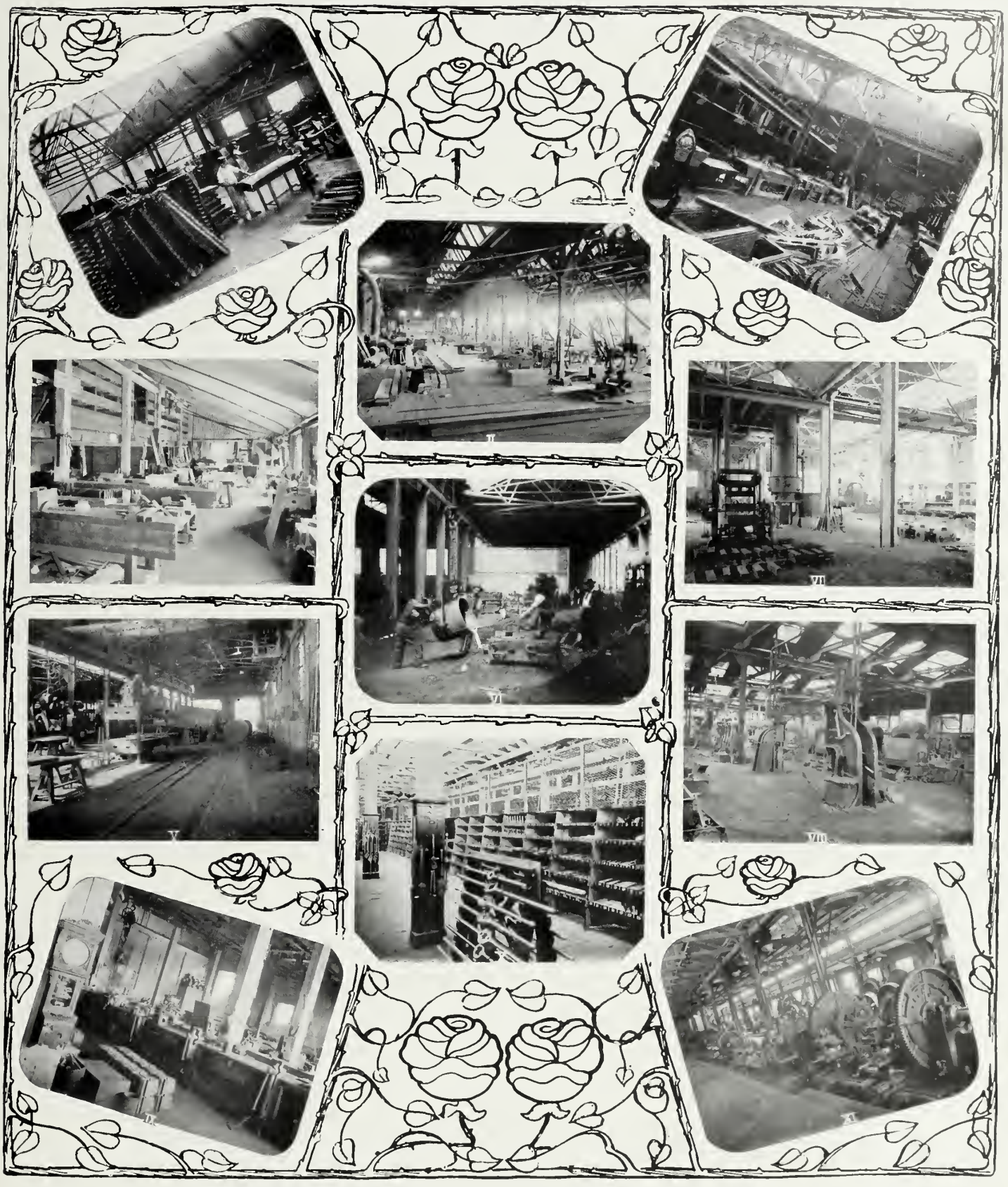
Date.	Line.	Length.
March 1st ..	Balfour-Grootvlei	12 miles 75 ch.
March 27th ..	Rayton-Cullinan	6 miles 10 ch.
August 1st ..	Eastleigh Junction-Vierfontein	9 miles 77 ch.
August 1st ..	Klerksdorp to Eastleigh Junction	6 miles 71 ch.
August 1st ..	Springs to Leslie	36 miles 69 ch.
October 2nd ..	Leslie to Bethal	45 miles 10 ch.
December 29th	Bethal to Breyten (123 miles from Springs)	40 miles

When the administration under review took over the railways in the Transvaal and Orange River Colonies on July 1st, 1902, the rates in the first-named Colony were those which had operated during the time the railways were in the possession of the

INTERIOR OF BREAKDOWN VAN, C.S.A.R.



VIEWS IN THE LOCOMOTIVE SHOPS, C.S.A.R., PRETORIA.



VIEWS IN THE LOCOMOTIVE SHOPS, C.S.A.R., PRETORIA.

Netherlands South African Railway Company. The classification and the basis were then as follows:—

Smalls	7d. per ton per mile.
Normal	6d. per ton per mile.
Intermediate	5d. per ton per mile.
Rough	3d. per ton per mile.
South African produce	2d. per ton per mile.
Special Tariff No. 7	1d. per ton per mile.
Special Tariff No. 9	1d. per ton per mile.

For 124 miles increasing for shorter distance to 2·4d. per ton per mile, for ten miles and decreasing for long distances to approximately 1d. per ton per mile.

On the 1st February, 1903, an all-round reduction of 20 per cent. was made on the above rates with the exception of smalls and Tariffs 7 and 9. The first named has not been altered, but Tariffs 7 and 9 were reduced so that 1d. per ton per mile was reached at 100 miles, whilst at 20 miles the rate was 2d. per ton per mile. On the 1st July of the same year Tariff No. 7 was further modified to maintain the rate of 1d. per ton per mile for practically all distances. At the same time a new class, Intermediate B, was introduced: the rate for this new class is the reduced intermediate rate less 14 2-7ths per cent. The present through port rates obtaining on the C.S.A.R. are based on the original figures which were charged from the Cape to Mid Vaal River, plus the rate charged by the Netherlands Company from Mid Vaal River to destination in the Transvaal. When the Natal Railways opened through to the Transvaal, the rates from Durban to Johannesburg and other Transvaal stations were fixed at the figures then operating from East London to Transvaal stations. The rates from Delagoa Bay were—on comparison with other routes—determined at figures which it was estimated would give to that port one-third of the traffic. The new class for special imported produce introduced on July 1st, 1903, was fixed arbitrarily at £3 10s. per ton from East London and Durban to Johannesburg, and £3 from Lourenço Marques; rates to other stations and from other ports being calculated *pro rata* to them. The basis over the C.S.A.R. for this class is approximately 1d. per ton per mile.

ENGINE OF THE C.S.A.R. READY FOR NIGHT MAIL.

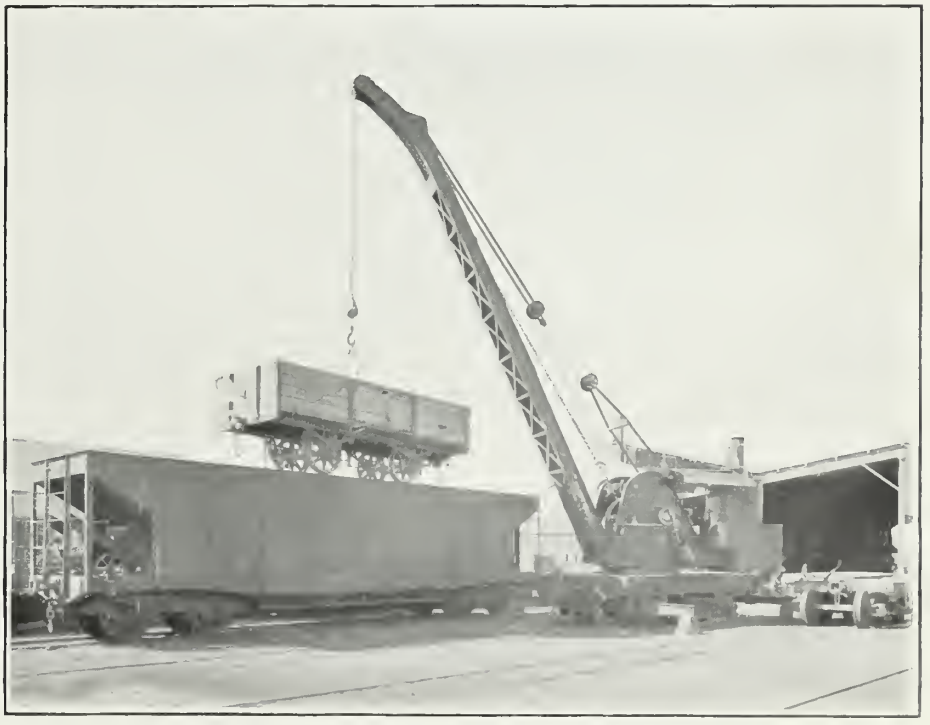
LOCAL TRAIN AT PARK STATION, JOHANNESBURG.

The locomotive workshops of the C.S.A.R. at Pretoria are on the site of and embrace the works of the late Netherlands South African Railway Company, which became the property of the Imperial Government in 1900. They then consisted of machine, erecting, carriage and wagon, and blacksmiths' shops, the actual ground covered being in extent two acres. About the end of 1903 they were extended to cover four and three-quarter acres by the addition of new carriage, wagon and paint shops, an erecting shop (600 ft. by 55 ft.), boiler shop, foundry, and power-houses. Still further extensions are to take place by the addition of new carriage-building and repair shops, saw mills, etc. The Pretoria Works will then cover about eight acres. The class of work accomplished is mainly locomotive, carriage, and wagon

repairs, but carriage-building is now being undertaken. The various small steam engines employed by the Netherlands Company to drive the shops

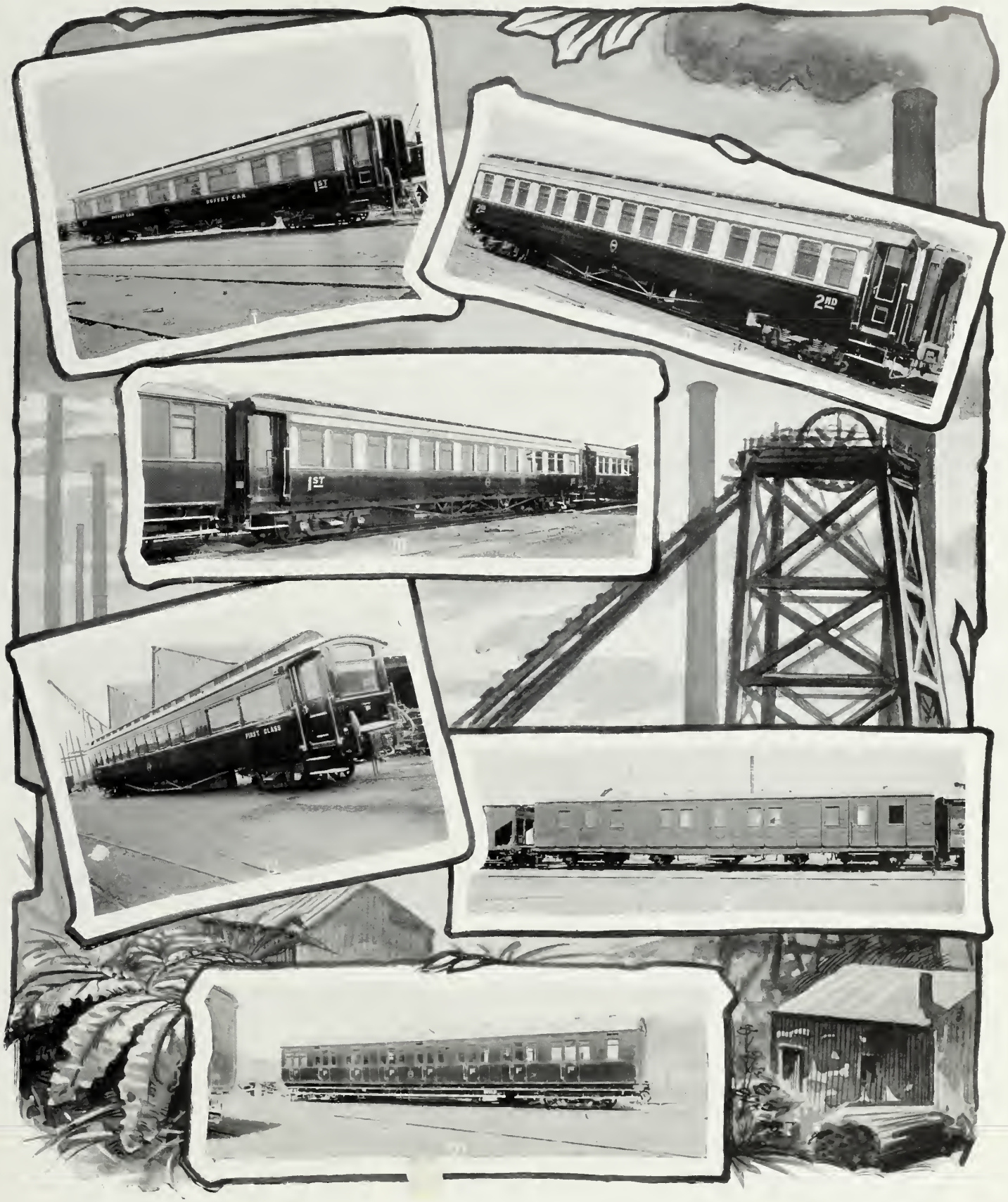
LOCOMOTIVE WORKS YARD, C.S.A.R., PRETORIA.

machinery were taken out, and electric motors were installed. There are two 175-kilowatt and one 75-kilowatt generators, driven by Bellis and Morcom vertical steam engines supplied with steam by Babcock and Wilcox's water-tube boilers, which are fitted with chain-grate "stokers." The dynamos in use at the shops were made by the Electric Construction Company, Wolverhampton. Compressed air is available all over the works, supplied by three 75-h.p. rotary compressors (Reavill, Lincoln). A small hydraulic plant is also installed. The first illustration of the first group in this article shows the temporary power-house. A new house, 60 ft. by 35 ft., is to be erected. It will take the present machines and also a 300-kilowatt, which is required to meet the increasing demands. Another illustration shows the new erecting shop, which will hold thirty engines, and is fitted with four electric cranes—two of 40 tons and two of three tons capacity—all supplied by Messrs. Stothert and Pitt, of Bath, England. A third illustration shows the boilers put down by the Netherlands Company. These are now being replaced by five Babcock and Wilcox's mechanically-stoked boilers. The boilers are fed by two Weir feed-pumps. The necessary supply of air to the fires is obtained by induced draught, the whole installation forming part of the new power-house. Other illustrations give views in the erecting shop and machine shop. The whole of the machinery is grouped (wheel lathes, drills, engine lathes, shapers, and slotting machines in separate "bays"), so as to reduce the movement of material to a minimum. The machinery in this shop is valued at £34,426 13s. One illustration shows the auto-machine "bay." The whole of these machines were supplied by Messrs. Herbert and Company, Coventry, and are probably the most complete installation of that type of machine in any railway works in the colonies. In group No. 2 is shown the tool store, which is worked on the "check" system, each workman depositing a check on drawing a tool, and being responsible for its return in good order, the check being then handed back to him. Additional illustrations give the millwrights' shop, the smithy, and views in the foundry. In the smithy the blast is supplied by two No. 4 Roots blowers, electrically driven. The foundry is very completely fitted: the two cupolas are blown by a No. 6 Roots blower, which also supplies the six brass furnaces. It is proposed to instal Meyers brass-smelting furnaces in the foundry. Three hydraulic moulding machines by the London Emery Works Company, and one pneumatic moulding machine by the Tabor Manufacturing Company, are constantly employed. A sand-mixer, mortar mill, rotary sand-blast for cleaning castings, pneumatic sieves, emery wheels, and band saw, with a three-ton electric crane, complete the equipment. There is also shown a view of the new boiler shop and press, and the 15-ton electric crane. The

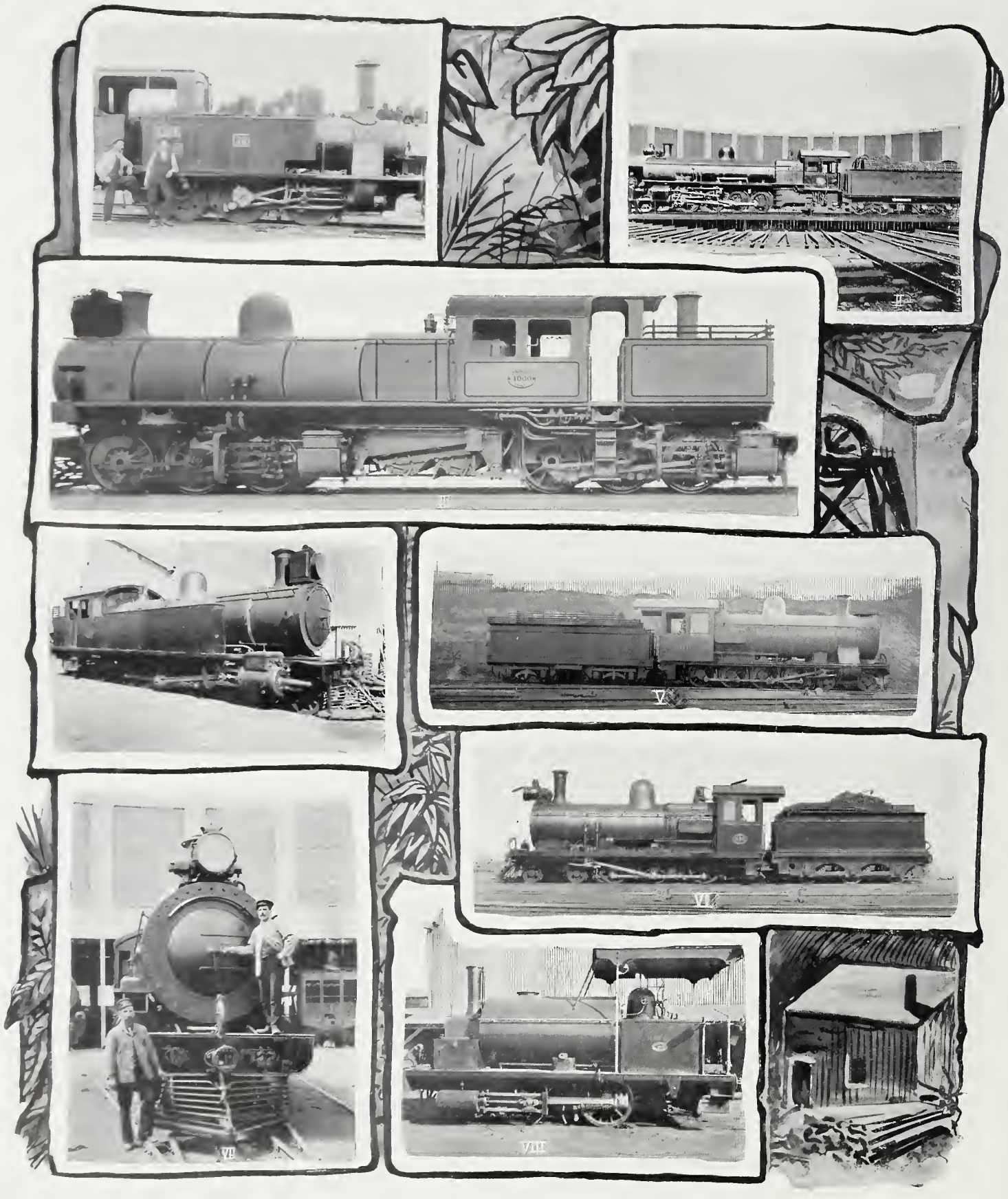


A 5-TON STEAM CRANE LIFTING N.Z.A.S.M. WAGON, C.S.A.R.

TYPES OF ENGINES AND COACHES IN USE ON THE C.S.A.R. LINES.



CARS AND COACHES OF THE C.S.A.R.



TYPES OF ENGINES IN USE ON THE C.S.A.R. LINES.

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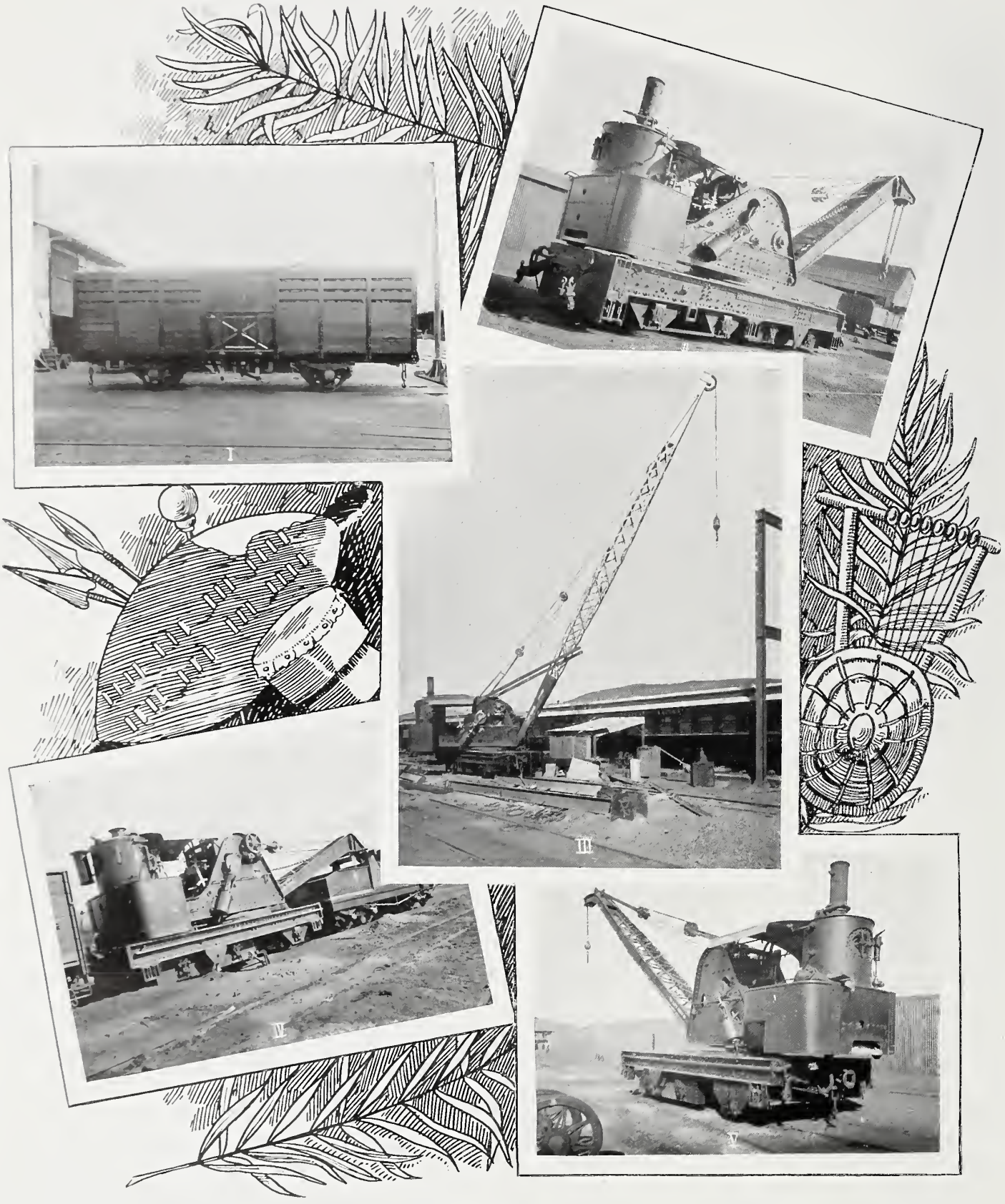


VARIOUS TYPES OF STEAM CRANES USED IN THE C.S.A.R. LOCOMOTIVE WORKS, PRETORIA.

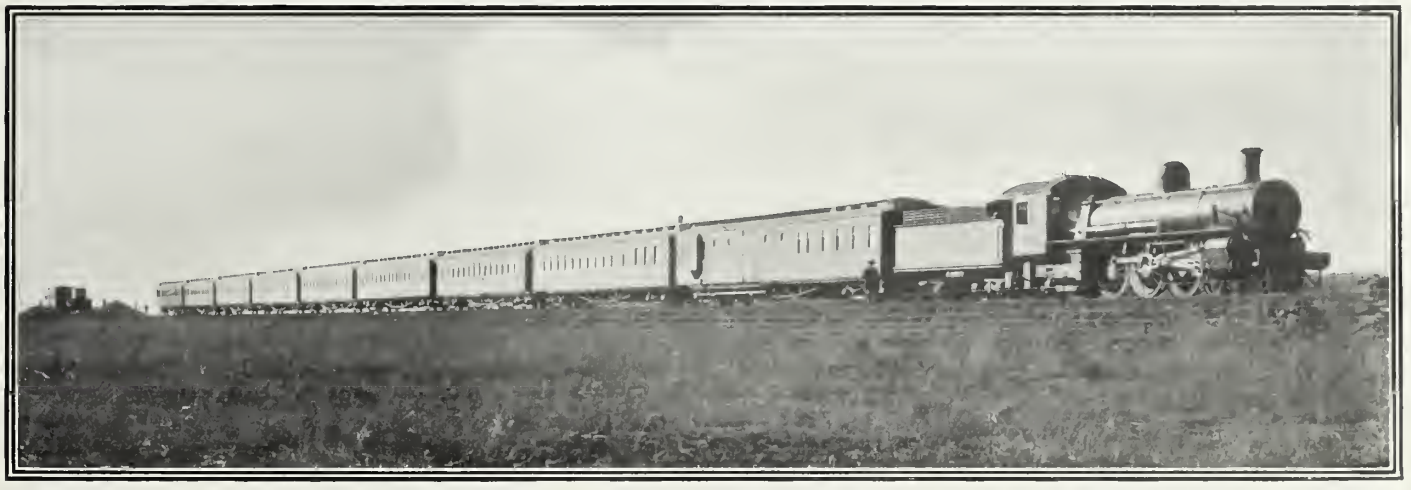
boiler shop and foundry are in the same line, and the crane road is continuous. Illustrations in the second group also include one of the pattern shop, and of the coach-body shop and sawmill. On the left-hand of the latter can be seen the shavings conveyor, an ingenious contrivance which, by means of an exhaust fan, carries all shavings and sawdust a distance of 200 yards to the boilers to be burnt. Another picture gives the trimmers' loft.

The staff at the Locomotive Workshops comprises 1,084 white employés and 498 natives—a total of 1,582.

Further photographs reproduced on other pages show various engines and types of rolling stock in use on the C.S.A.R. lines, large cranes employed, and views of the works yard. At the time of writing the rolling stock of the Central South African Railways consisted of 481 engines, 465 coaching vehicles, and 7,589 goods vehicles. Among the illustrations in the letterpress are two of the standard breakdown van in use on the system. The fittings are very complete, and in each car accommodation is provided for the foreman in charge and the men of the breakdown gang. This van, with a 15-ton steam crane and packing truck, form the complete train. The view of the works yard shows four coaches of a train-de-luxe, and another interesting picture is that of a five-ton steam crane lifting one of the N.Z.A.S.M. type wagons over one of the latest steel bogie hopper wagons, which has a carrying capacity of 85,000 lbs. These hoppers were built by the Leeds Forge Company, Limited. The high-sided goods truck shown among views on page 48 was built in the works as an experiment. It has been running for some twelve months, and is found very satisfactory. The various types of steam cranes illustrated, which are in use at the works, of five, ten, and fifteen tons capacity respectively, were built by Messrs. Cowans, Sheldon & Company, Ltd., Carlisle. A long jib (60 ft.) is provided for two of the ten-ton cranes. These were found to be most useful in erecting the new works buildings, which are of steel.

OBSERVATORY CAR, FITTED FOR CONVEYANCE OF EX-PRESIDENT KRUGER'S BODY, C.S.A.R.

A feature of the passenger trains in use under the C.S.A.R. system is the large number of corridor cars employed. For the suburban traffic from Johannesburg these cars are found to be most convenient for short distance travelling. They have a passage-way in the centre, and are provided with separate lavatories for either sex at the end. The corridor coaches in use for the through mail trains running long distances to the seaboard in either direction have the passage at the side, with four sleeping berths in each compartment. Buffet cars are attached to the through trains, and also to many of those travelling between Johannesburg and the capital city, Pretoria. Our illustrations show the luxurious fittings of the parlour and train-de-luxe cars of the C.S.A.R.



TRAIN-DE-LUXE, READY FOR JOURNEY, C.S.A.R.

Ecclesiastical.

The Anglican Church.

THE Church of the Province of South Africa is a voluntary association which is in spiritual communion with the Mother Church, the Church of England, but which has no legal identity with that Church, and has separated from it, "root and branch," according to the judgment of the Supreme Court at Capetown, and the Privy Council. This separation is evident from the third proviso of their constitution, which was adopted in 1870, according to which their Bishops do not take the oath of obedience to the Archbishop of Canterbury, and in matters of faith and doctrine they ignore the decisions of the highest legal courts established by the Crown and binding on the Mother Church. It is enough to state briefly that the separation had its origin in the efforts of Bishop Gray of Capetown to assert the independence of the South African Church from the see of Canterbury, but it was accentuated later by the Colenso controversy of 1863-66, though up till then Bishop Colenso seemed to approve of the idea. Bishop Colenso of Natal was a fearless and broad-minded divine who may be said to have lived in advance of his times, and who, in his published works, threw doubts upon the historical accuracy and authenticity of the Pentateuch. In the ensuing conflict with Bishop Gray of Capetown, who tried to convict him of heresy, and to depose him from his see, Bishop Colenso was supported by the Privy Council—just as Mr. Long, a clergyman in the Capetown diocese, had been supported in his struggle with the Bishop two years previously. Bishop Gray then organised, by synodical action, the present constitution and canons of the Church of the Province of South Africa, and the first provincial Synod was held in 1870. Meanwhile Bishop Colenso retained his office, and was supported by a number of the Natal churchpeople, who kept all the property of the diocese and who bound themselves to remain under the same constitution as the Mother Church, and styled themselves "the Church of England in Natal." This association is still at work in Natal. Though its adherents have not had another Bishop since Colenso died in 1883, they are influentially supported by prominent laymen in England, and they have established a branch in Johannesburg, since the war, which recognises the jurisdiction not of the Bishop of Pretoria, but of the Archbishop of Canterbury.

In 1878 Bishop Bousfield was consecrated in England to organise the new diocese of Pretoria. On arrival there, after a long and trying journey over bad roads, he found a humble thatched building, just capable of holding 100 people, which was used as a church,

HIS LORDSHIP
THE BISHOP OF PRETORIA.

with a Bishop's cottage and parsonage in another part of the village. Bishop Wilkinson of Zululand, who had done a lot for the diocese ere the foundation of the see, had secured the ground for Church purposes, as he had done at Potchefstroom, Zeerust, and Lydenburg. The Boer Government never granted sites for churches to the English Church, though other denominations were liberally provided for. After the retrocession of the Transvaal in 1880, the Church sank to a very low ebb, owing to the depression amongst Britishers, and fell into debt to the extent of £4,000. Bishop Bousfield visited England in 1885 and raised funds sufficient to discharge the debt, the diocese being managed during his absence by Mr. Roberts, the only other priest, who was afterwards appointed Archdeacon of Potchefstroom. The discoveries of gold in 1886 had the effect of cutting off supplies from home, it being seriously thought that with so much gold in the Transvaal no further outside help was needed, whereas to cope with the incoming population an enlarged staff and fresh funds were urgently required, and it was a matter of much regret to the Bishop that his resources were so inadequate to deal with the problem confronting him.

It is not intended here to give a history of the gradual growth of the Church in the Transvaal. The little thatched building in Pretoria gave place to the present rather mean-looking S. Alban's Cathedral, and three Canons were appointed to assist the Bishop, Canons Fisher, Sidwell, and Farmer. The former was Rector of Pretoria, and died in 1902, much lamented. A diocesan school was established at Pretoria, under Canon Sidwell, and the native mission work was entrusted to Canon Farmer. In Johannesburg, where Englishmen, and especially churchmen, were in such a minority, a beginning was made with S. Mary's Church under the charge of Mr. Darragh, and churches were built in two of the suburbs, Doornfontein and Jeppestown. Bishop Bousfield died during the war, having laboured first as a pioneer in a poverty-stricken and scantily-populated land, and then in an endeavour to impress upon the incoming uitlander population their moral and religious obligations, at a time when everybody was seized with the lust for wealth, and all seemed to forget that "man liveth not by bread alone." The diocese over which the Bishop of Pretoria presides is co-extensive with the Transvaal. The Bishop is elected by the clergy and lay representatives of the diocese, and has three Archdeacons to assist him in the work of supervision. Most members of the Church of England who come to the Transvaal from the Old Country seem to expect to find everything in the way of spiritual ministrations provided for them free of

cost, as at home, forgetting that the diocese has only existed since 1878.

The Anglican Church has made a great advance in organisation and influence since the war. It will soon be entirely independent of support from home, but men and money will always be required to keep pace with the rapid growth and transmutation of the country. From January 1st, 1904, to June 30th, 1905, twenty new clergy came to work in the diocese, but as against this no fewer than eleven resigned their work and returned to England. The Bishop has 64 clergy working under him, inclusive of army chaplains and five native clergy, 38 more than he found in the diocese when he came in November, 1902. During 1904 nine fresh districts were opened up and provided with resident clergy—viz., Belfast; Belgravia, Johannesburg; Nylstroom and Warmbaths; Parktown, Johannesburg; Railway Camp, Pretoria; Randfontein; Rosettenville, Johannesburg; Sunnyside, Pretoria; Waterval Boven and district. Ten new churches have been built—Belgravia, Johannesburg; Cleveland; Doornfontein; Gezina, Pretoria; Krugersdorp; Railway Camp, Pretoria; S. Saviour's, City and Suburban; Vereeniging; Vlakfontein; Witbank. There are three archdeaconries in the diocese—Krugersdorp, Potchefstroom, and Johannesburg. The latter was constituted in 1903, comprising the district along the Reef from Heidelberg to Randfontein, as far north as Irene and south to Vereeniging. The Rev. M. B. Furse, Fellow and Dean of Trinity College, Oxford, came out from England to fill the responsible post of Archdeacon of Johannesburg. In the same year a branch of the Community of the Resurrection, whose headquarters are at Mirfield, Yorkshire, was established at the Bishop's request, Rev. J. O. Nash being the head. Three of their clergy are engaged on European work and two are occupied in superintending the native missions along the Reef. The brethren of the Community have their time fully occupied, and without their assistance the work of the Church in the Transvaal would be seriously curtailed. The diocese also enjoys the services of five clergy for Railway Mission work, the money required for supporting them being supplied by the Central Fund of the South African Railway Mission, which at present is mainly sustained by contributions from England. The itinerating work of the diocese falls on the shoulders of one clergyman, the places at which he ministers being so wide apart as: Carolina, Lake Chrissie, Grasdale, Lichtenburg, Goededacht, Blaauwbank, Bethal, Heckpoort, Wolmaransstad, and Ventersdorp. The diocese maintains two schools for boys, at Pretoria and Johannesburg. The former has 90 pupils, and the latter 60. The school at Johannesburg has suffered very much from the competition of the Government High School, which has better buildings and more funds available for its support. The fees at the Diocesan School, according to a boy's position in the school, vary from four to eight guineas per month. The Government does not make any grant towards voluntary schools, though the Boer Government allowed £250 per annum to the Diocesan School at Pretoria. It therefore remains with the Church people in the diocese to provide what is necessary in the way of funds, a sum of £15,000 being required for the Johannesburg school alone. It is of the greatest importance for the future of the Church that there should be at least one properly-equipped Church school in the most important centre of the Transvaal. There are also Church schools for girls at Pretoria and Johannesburg.

PROPOSED NEW CHURCH, S. MARY'S, JOHANNESBURG, showing Parish Hall and connecting cloister.

The chief centres of Native Mission work are at Potchefstroom, S. Cyprian's (Johannesburg), Krugersdorp, Pretoria, Rustenburg, and Pietersburg. There are 5,000 native communicants, 33 schools, and 205 native workers, paid and voluntary. The Society for the Propagation of the Gospel makes a large grant for this branch of the Church's work. Old S. Mary's Church has been pulled down and a new

Church and Parish Hall are being built (as shown in illustration) at the corner of Hoek and Plein-streets, on a site granted by the Government. Mr. Darragh is still the energetic Vicar of S. Mary's. It was through his advice that stands were bought in the centre

S. MARY'S PARISH HALL, JOHANNESBURG.

of Johannesburg in the early days which have since been disposed of to great advantage, the proceeds going towards the building of the new church.

The Dutch Reformed Church.

After the settlement of the Dutch in the Transvaal they were regularly visited by Cape clergymen, among these being Dr. Robertson, Dr. Murray, and the Rev. Mr. Neethling.

The Dutch Reformed Church in the Transvaal was first organised in 1853, the year following the Sand River Convention, under the leadership of the Rev. Mr. Van der Hof, who had come out from Holland. The population of the Transvaal at that time was of a very different character to that of the Free State and Cape Colony. It comprised all the more irreconcilable of the emigrants who had left Natal and the Orange River Sovereignty rather than submit to British rule, besides a number of violent and lawless characters who had at various times since the Great Trek crossed over the Vaal River. The Rev. Mr. Van der Hof separated the Transvaal Church (under the title "Nederduitsch Herformde Kerk") from the Cape Church, and he was supported by those who had a dislike of England and an aversion to all modern civilisation, but a large percentage of the population wished to retain their allegiance to the Cape Church. In 1862 the Rev. F. L. Catchet organised these latter as a religious body in direct communion with the Nederduitsch Gereformeerde Kerk—the Cape Church. The first schism took place in 1859 under the Rev. Mr. Postma, and led to the foundation of the Dopper Church, the chief centre of which is the Rustenburg district. President Kruger was a member of the Dopper Church, and the church in which he preached opposite his residence in Pretoria belonged to the Doppers. The Doppers have no doctrinal differences with the Dutch Reformed Church, but they forbid the singing of hymns, and use the Psalms of David as canticles, while they claim to be more rigid in their clinging to Calvinistic tenets than their brethren. In 1885 the Nederduitsch Herformde and the Gereformeerde Kerk united, and have since been known as the Dutch Reformed Church, in full communion with and as a branch of the Dutch Reformed Church of South Africa. The second secession occurred in 1888, the old title of Nederduitsch Herformde Kerk being adopted by the secessionists. Christian Joubert, the Commissioner of Mines, was largely responsible for this fresh division, nominally on the ground that the Dutch Reformed Church was too placable towards the English people, but in reality because he and a number of others chafed at the strict discipline. The Rev. Mr. Godefroi was invited out from Holland to minister for them, and they now support eight clergymen, four from Holland and four from their former Church. In general it may be said that the influence of the clergy who have been trained in Holland has tended to rationalise the ultra-conservative teaching which is inculcated at the Theological College at Stellenbosch, in Cape Colony. There are now 37 congregations of the United Dutch Reformed Church in the Transvaal, with 30 ministers, and a total of 80,000 adherents. There are 160 schools, and 6,000 children attending them. The Government confiscated all the school property of the Church after the war, on the ground that they had received large subsidies from the State, but on

the other hand it is to be remembered that the Church had rendered great service to the State in the way of education, as it has done in Cape Colony and other parts of South Africa. The leaders of the Dutch Church are in favour of State schools conducted on non-sectarian lines, provided that sufficient provision is made for teaching Dutch, and that the local school committees have the power of appointing the teachers, who must satisfy the Director of Education that they are professionally qualified, and of good character, etc. Lord Selborne's Education Minute of 1905 has made some concession towards Dutch feeling, and it is to be hoped that other denominations will combine to secure for future generations a liberal system of non-sectarian education, supported by the State, to which all parents can subscribe. Nothing will help more to amalgamate the two white races than such a system, where the children are not marched into opposing camps. The Rev. H. S. Bosman is the Moderator of the Church, and lives at Pretoria, where a splendid new church has been built in Vermeulen-street to replace the old church which stood in Church-square. The form of government and the system of doctrine is in close affinity with the Presbyterian system.

The Roman Catholic Church.

The Transvaal, previous to 1886, formed a portion of the Natal Vicariate, but it was until recently an independent Prefecture. The first chapel in the Transvaal was at Pilgrim's Rest, but it no longer exists, as the locality was practically abandoned by the speculative mining population, which was attracted to Witwatersrand. Mass has been celebrated at Potchefstroom, the ancient capital of the Transvaal, since 1864. The Pretoria Mission was founded in 1877 by Bishop Jolivet, O.M.I., but the present church was not completed till 1887. The Rev. Father Monginoux is Prefect Apostolic of the Transvaal. The Transvaal is now a Vicariate Apostolic, of which the first Vicar Apostolic is the Right Rev. William Miller, O.M.I., consecrated, as titular Bishop of Eumemia, on the 20th November, 1904, with headquarters at Johannesburg. The Johannesburg Mission was founded in 1887, when a temporary chapel was erected at the corner of Fox and Smal-streets. The present Cathedral Church of the Immaculate Conception was opened in 1896. As in Australia and America, the two great continents towards which the stream of emigration flows, so in South Africa, the Catholic Church is splendidly organised at every centre of population, and the youthful colonist finds the same religious influence at work as he has been accustomed to in the Old Country. In Johannesburg the Catholic Church has been for many years directed by Father De Lacy, and it is largely due to his real devotion and foresight that the Church is in such a strong position to-day, and that it is organised on sound lines, which promise well for the future. He is assisted by a large staff of priests, who live together at the Presbytery. Among the most flourishing and popular charitable organisa-

THE DUTCH REFORMED CHURCH AT CLIFTON, BRAAMFONTEIN.

THE NEW DUTCH REFORMED CHURCH, VERMEULEN-STREET, PRETORIA.

tions of the town is the Nazareth House, one of five similar institutions in South Africa, which provides a home for the aged poor and orphans, irrespective of

ROMAN CATHOLIC CHURCH, KERK-STREET, JOHANNESBURG.

creed, and which is conducted by the Sisters of Nazareth. The accommodation has recently been enlarged at a cost of £12,000. The Johannesburg Hospital owes its initiation to the efforts of prominent Catholic laymen, and was founded in 1893. There are a number of convents and boarding schools where the pupils receive the most careful teaching. In Johannesburg there are five convent schools, and there are others at Pretoria, Potchefstroom, Lydenburg, Klerksdorp, Heidelberg, and Krugersdorp, while the Marist Brothers have a school on Hospital Hill, Johannesburg, accommodating about 500 boys. There is another institution, founded in 1904, which admittedly fills a long-felt want in such a cosmopolitan and unsettled population, the Home of the Good Shepherd, at Norwood, conducted by a party of Irish Nuns. It is one of the plague spots of our colonial life that there are not the same restraints to help men to lead pure and healthy lives as they are accustomed to at home, and where, as in Johannesburg, the excessive cost of living makes it impossible for many men to marry. It is only too true that the town has its attractions for many unfortunate women from all parts of the globe. The nuns who conduct the Home of the Good Shepherd are bravely and sympathetically struggling to infuse new hope into the lives of the demoralised, and to cope with the terrible evils which follow in the train of this social degradation. The new building of the Catholic Club was opened in 1903. It provides a very commodious and cheerful centre for the youth of Johannesburg, including non-Catholics, and in spite of the post-bellum depression it has been conducted on a sound paying basis.

The Presbyterian Church.

In surveying the work of the Presbyterian Church of South Africa in the Transvaal, it is important to observe that, as in the other colonies of South Africa, there are encouraging signs of beneficial co-operation with the Dutch Reformed Church, and that such co-operation between the two Churches is regarded by South Africans as rich in political possibilities, and as very promising in the direction of a closer union between the white races. The affinity between the two Churches, the common standpoint from which they view such questions as education, Sabbath observances, etc., and the social fraternity between Scotch and Dutch, suggest that the idea of amalgamating these Churches may be more than a pious hope. The Caledonian Society has flourishing branches in the populated districts of the Transvaal, and it renders useful service to the Presbytery by bringing together so many who were baptised into the Presbyterian Church at Home, but who would otherwise remain out of touch with their ministers. The first church of this denomination in the Transvaal was founded by the Rev. A. Allan in 1890 in Johannesburg, and the congregation worshipped in Bree-

THE PRESBYTERIAN CHURCH, GERMISTON.

street. This building has been disposed of, and a larger church (S. George's), with seating accommodation for 1,000, has been built in Noord-street, at a total cost, including site, building, and organ, of £25,000. The present minister is the Rev. Dr. Ross, who came to the Transvaal from Newcastle-on-Tyne in 1903. The other churches in Johannesburg are at Jeppestown, Fordsburg, Braamfontein, Clifton, and Turffontein. There are permanent churches and ministers also at Pretoria, Heidelberg, Potchefstroom, Krugersdorp, Germiston, Vereeniging, Springs, and Boksburg, with a total membership in the Transvaal of about 2,000. The Germiston church is shown in our illustrations. It has been only recently built, at a cost of £11,000. The church in Pretoria has a valued supporter and worker in Mr. H. Crawford, who acts as financial adviser in an honorary capacity to the various funds of the whole Presbyterian Church of South Africa. There are 15 native mission stations (under the Rev. C. B. Hamilton) in the Transvaal, maintained at a cost of £700 per annum, and this body has been the first to tackle the difficult work of evangelising the Chinese coolies working along the Witswatersrand. The recent dissensions among the Churches in Scotland has resulted in a temporary withdrawal of £150 per annum granted for Transvaal mission work. In all other respects the Presbyterian Church throughout South Africa is self-supporting and its work is replete with interest.

The Wesleyan Church.

The work of this Church in the Transvaal was organised by European ministers in 1870. In the earlier period a number of English day schools were carried on, but these have not been resumed since the war, as this body, in common with the other Free Churches, is content that elementary education should be in the hands of the State, simple Bible teaching being allowed as part of the regular course. The following are the latest statistics of this influential and carefully-organised Church:—

European ministers ..	53
Native ,, ..	20
Churches..	242
Sunday school teachers	672
Members of the Church	22,098
Lay preachers	929
Number of baptisms in 1904	4,107
Sunday school scholars	4,800
Voluntary offerings in 1904	£39,000

These statistics, furnished by the General Superintendent, tell their own tale of enterprise and progress. The vigour and completeness with which the Wesleyan community organises are universally acknowledged, and up to the time when war broke out in 1899 Wesleyans had by far the largest following among English religious denominations. One of the first public acts performed by Lord Selborne as Governor of the Transvaal was to lay the foundation-stone of extensions to a Wesleyan Church at Fordsburg, a suburb of Johannesburg, which when completed will seat 850 worshippers.

WESLEYAN CENTRAL CHURCH, PRESIDENT-ST., JOHANNESBURG.

CENTRAL CONGREGATIONAL CHURCH, BREE-ST., JOHANNESBURG.

The Congregational Union.

The Congregational is among the smallest, numerically, of the Churches established in the Transvaal. It was late in planting, and has been somewhat slow in growth. The principal church for white people is in Bree-street, Johannesburg. Among the Cape coloured population, however, this denomination is particularly strong Five new churches were opened during 1905, and in the same year a hall for a Young People's Christian Association was completed, which, it is hoped, will do much for the intellectual and moral, as well as spiritual development of the members. An excellent monthly magazine, *The Outlook*, with a large circulation, is published by the Bree-street church.

THE BAPTIST CHURCH, PLEIN-STREET, JOHANNESBURG.

The Baptist Church.

The Baptist community, while having many adherents in the Transvaal, is by no means numerically strong. The establishment of its Church is probably due to many of the pioneers of that faith who came from Grahamstown (Cape Colony) about the year 1888. Their first branch in Johannesburg, which is situated in Plein-street, was opened on June 28th, 1901. It was erected on part of two stands granted by the late Republican Government, similar to grants to other Churches. At about this period the ramifications of the Church extended to Pretoria, and branch churches and congregations were established at Krugersdorp, Boksburg, Troyeville, and Germiston. In 1890 the Baptist Church of the Transvaal became known as the Transvaal Baptist Assoeiation, and in 1898 this was merged into the Transvaal Baptist Church Council. Work amongst the natives has been carried on for years by the individual churches of this faith, and native evangelists have been trained. In 1903 the Transvaal Baptist Missionary Society was formed, with its headquarters at Pretoria, where a superintendent is in charge. The members of the Baptist Church are earnest in their endeavours to promote the spiritual welfare of their adherents in the Transvaal.

The Salvation Army.

The operations of the Salvation Army throughout South Africa are conducted in the vigorous and effectual manner which has gained for this organisation world-wide reputation and influenee. The work in Johannesburg commenced in quite early days, a handful of the Army being drafted to the Rand as pioneers of the larger corps to eome in the future. The headquarters of the Army in South Afriea are at Capetown, and the headquarters for the Transvaal Colony, Natal, and the Orange River Colony are at 112, Bree-street, Johannesburg. In addition to the preaching, visiting, and conversion work done by the Army workers, Johannesburg has received vast benefit from the "soeial" labours undertaken by the Salvation officers, whose shelter, Social farm, Rescue, and "Prison Gate" organisations have rendered help and eomfort in thousands of most abject and helpless cases.

JEWISH SYNAGOGUE, PRESIDENT-STREET, JOHANNESBURG.

During 1905, the Army "shelter" in Main-street provided 1,952 free meals, 4,232 free beds, and 17,284 cheap beds to persons in different stages of distress and destitution. The Driefontein Social Farm admitted 60 men, four from prison and 56 from the streets, of whom 41 left for situations and employment, six were sent to friends, and four to hospital. The "Prison Gate" Brigade received 21 men into the Home, and gave temporary assistance to fourteen, while others obtained situations or went to the Social Farm. "The Haven," or Rescue Home, in Fordsburg, admitted 26 women, and found situations for 20; 22,308 meals were given, and 35 outside cases were assisted. These institutions are kindly, carefully, and cleanly managed, and their influence is good and in many cases lasting. Much teaching and visiting is also done among the native population. The whole community of Johannesburg, high and low, joins in honouring and assisting the Salvation Army in its admirable work, and it is universally acknowledged that this organisation succeeds in getting into touch with and influencing classes of the community that no other religious or social force seem to reach. The work is in earnest, capable hands, and the officers of the Army in South Africa can show as good a record of work well done as any other branch of their great organisation. "The Haven," one of the most useful of the institutions supported by the Army, is situated at the western end of the suburb of Fordsburg, and has a stretch of open land beyond, the site thus being very desirable. Neatness and cleanliness are the distinguishing features of the interior, which contains everything necessary for the comfort of the inmates. These are expected to do the work of the establishment. A cheerful, airy dormitory with nine beds, a hospital ward with four beds and two cots, a private ward for paying patients which helps to support the institution, a large dining-room, work-room, and kitchen, a spacious yard where washing can be satisfactorily done, and a sitting-room for the matron, make up a very complete establishment. The matron is a trained and qualified nurse. The inmates are not allowed to leave the Haven until safely and satisfactorily provided for, either with a home among friends, or a situation where a good salary can be earned. Sound common sense is displayed in dealing with those who seek help at this refuge, and this is typical of most of the work, especially on the social side, conducted by the Army. "The Haven" was founded in 1892, and the foundation-stones (as duly recorded upon them) were laid by many women interested in the work.

The Jewish Church.

The first Jewish congregation in the Transvaal was started at Barberton in 1883, after the gold discoveries. Johannesburg is the principal centre of this creed in South Africa, having the largest relative number of adherents (15,000), outside of Aden and Gibraltar, in the British Empire. The establishment of their organised community in Johannesburg dates from 1887, when 88 Jewish pioneers formed themselves into the "Witwatersrand Goldfields Jewish Association." In the same year the Boer Government granted to this community their present cemetery, in which 829 burials had taken place up to the end of 1903. The first services were conducted on the High Festivals of 1887 by the Rev. Joel Rabbinowitz, of Capetown, in a

DR. J. H. HERTZ, Chief Rabbi, Witwatersrand Jewish Congregation.

temporary hall. The Rev. Mark L. Harris was appointed the first minister of the "Witwatersrand Hebrew Congregation" in 1898, being succeeded 10 years later by Dr. J. H. Hertz, of New York. Besides three synagogues, Johannesburg possesses numerous communal institutions, a Jewish school, an orphanage for all South Africa, a benevolent aid society, and a Chevra Kadisha, which combines the functions of a Burial Society with those of a Board of Guardians. There are at present 16 congregations throughout the Transvaal, Pretoria being next in importance to Johannesburg, with a synagogue and a Jewish public school. There are also synagogues in Heidelberg, Volksrust, Krugersdorp, Klerksdorp, Germiston, and Roodepoort. Some mention should be made here of the special disabilities which the Jews suffered during the Boer régime. The "Grondwet" of 1896 debarred Jews and Catholics from military posts, from the position of President, State Secretary, or magistrate, from membership in the First and Second Volksraads, and from superintendencies of natives and mines. The educational disability was the most grievous. Teachers and children of both these creeds were excluded from the State-subsidised schools. President Kruger and the Executive Council were approached before and during elections, in times of calm and in times of commotion, officially and unofficially, through individuals, deputations, and committees. The stereotyped reply to one and all was that they should trust to God and the goodwill of the President, who resembled Oliver Cromwell in his Puritan obstinacy but not in his clemency towards the Chosen People. Apart from political grievances, however, the relations between Jews and Boer have always been of the most cordial nature. The Jewish Board of Deputies for the Transvaal and Natal was founded in 1903 to watch over the interests of the Jews in these colonies as regards legislative and municipal enactments. The enthusiastic ideals of Zionism—*i.e.*, the movement in favour of creating a Jewish State, politically independent and religiously homogeneous—are well supported by the Transvaal Jews, despite what is said about their worship of mammon, and the wealthy Johannesburgers are liberal subscribers to the Russian Relief Funds raised in London, in addition to the local funds. As in Europe, so in South Africa, one sees the differences of opinion between Territorialists and followers of Herzl militating against that forward movement which, once started, is bound to lift the whole Jewish race out of the backwater of national progress, but it is hoped that the next Congress at Basle will result in a settlement embodying the views of both parties. When that desirable consummation takes place it will be found that there is an immense amount of latent enthusiasm among South African Jews, and it may be hoped that this forward movement will revive a moderate subservience to rabbinical teaching and custom, which wielded such a potent influence in the Middle Ages, and maintained such a high standard in the commercial life of the times. A photograph of the Old Synagogue, President-street, Johannesburg, is shown. It will shortly disappear: a new Synagogue is being built in End-street, to cost £35,000. Dr. Landau is president of the Johannesburg Hebrew congregation of the Synagogue adjoining Park Station.

Transvaal Volunteers.

IN the closing stages of the late war, a Committee composed of many influential citizens of the Rand, under the presidency of Major-General Oliphant, M.V.O., was formed for the purpose of discussing the question of the formation of a Volunteer Force for the Transvaal, and to formulate a scheme for the organisation. The Committee recommended that a certain number of mounted corps should be formed, to perpetuate those irregular corps which had been raised in the war and which had rendered much valuable service. In October, 1902, the first Volunteer Corps Ordinance of the Transvaal was gazetted, and immediately afterwards the regulations framed thereunder were passed. The Imperial Government had, on the disbandment of the irregular corps, approved of the free grant of a certain number of horses, saddlery, and equipment, for the purpose of giving the Volunteer movement a start. The corps were: The Imperial Light Horse, South African Light Horse, Johannesburg Mounted Rifles, and Scottish Horse. Accordingly, these corps, together with the Central South African Railway Volunteers, the Transvaal Light Infantry Volunteers, the Transvaal Scottish Volunteers, and the Railway Pioneer Regiment, were gazetted on the 12th December, 1902, together with their respective commanding officers and staff. At the end of the first financial year (30th June, 1902), after nine

COLONEL BRIGGS,
Comdt., Transvaal Volunteers.

months' existence, the Volunteer Force had an enrolled strength of 3,781 of all ranks; at the end of the second financial year the numbers were 4,644, and at the end of the third financial year 5,030. The enrolled strength of the Force in March, 1906, was 7,002. The Force is staffed by officers and other ranks of the Imperial army and ex-irregulars. The cost of this staff, from the 1st November, 1902, to the time of writing, had amounted to £99,072. Had it not been that arms, equipment, and saddlery had been granted as a free gift by the Imperial Government, the cost would naturally have been considerably more. The Force is armed with ·303 Lee-Metford and Lee-Enfield rifles. Other armaments include:—Three 12-pounder naval guns and three maxims, obtained on loan from the Imperial Government, on charge of the Central South African Railway Volunteers, for duty in connection with the armoured trains; one Colt gun and ten maxim guns, purchased by the Transvaal Government; two Colt machine guns, presented by the Directors of the East Rand Proprietary Mines, Ltd.; one Colt gun, presented by the New Kleinfontein Gold-mining Company; one Colt gun, presented by the Van Ryn and New Modderfontein Gold-mining Companies; one maxim gun, presented by the Directors of the Castle Brewery Company; eight field guns, on loan from the Army, for the Transvaal Horse Artillery Volunteers. At the time of writing, new pattern quick-firing guns for the Horse Artillery were expected from England.

Each corps has selected a suitable and serviceable working uniform of khaki, the initial cost of which is met by a grant from Government, the up-keep being defrayed from corps funds. The Force is in possession of complete and serviceable signalling equipment, sufficient for its requirements. The capitation grant is liberal, and ample to cover the expenses which a Volunteer corps can be expected to meet, and the conditions under which the grant is earned compare favourably with those of other Colonies. The grant is:—£6 for a mounted Volunteer; £5 for an infantry Volunteer; £2 for Cadets capable of bearing arms, and £1 for those incapable of bearing arms. The amount of horse allowanee given

SIR GEORGE FARRAR, D.S.O., M.L.C.

Q.M.-SERGT. & SIG.-INST. DUNN
(formerly in charge of the Company of Military Signallers).

to each man who has made himself efficient by the end of the Volunteer year is £1 10s. per mensem. In order that a man who is desirous of joining

MAJOR ROLAND,
Controller, Transvaal Volunteers.

a mounted Volunteer corps, and who is unable to meet the cost of keeping a horse, can make himself efficient, a training grant is allowed for the purpose of enabling him to hire a horse to attend parades and the annual camp. This grant is fixed at 15s. per parade and 30s. for each day in camp. The discipline of the Force is controlled by regulations framed under the Volunteer Corps Ordinance of 1904, and provides for both active and ordinary service. The Force may, according to the Ordinance, be called upon to proceed to any place where the interest of the Colony may require. Each corps has a Rifle Association, to which every man must belong, and he fires his annual course for efficiency under its auspices. All ranks show the greatest interest in this most important portion of their training. There are no fewer than 32 rifle ranges in working order, comprising 189 targets, supplied with the latest and best appliances. The marking is done by specially trained natives. The free allowance of ball ammunition is 150 rounds per man, while the price fixed at which a Volunteer may purchase an extra amount is 9d. per packet of 10 rounds.

The Volunteer headquarters in Johannesburg were opened in October, 1904. The building has attached to it the largest hall in South Africa, being 150 ft. by 80 ft. All corps whose headquarters are in Johannesburg have their offices here. In addition there are the outside district headquarters at Pretoria (the Northern District), Potchefstroom (Western District), and Standerton (the Eastern District).

A scheme is now in force whereby a Volunteer, by the payment of a small annual premium, is able to insure himself against pecuniary loss by the death of his horse. The saddlery received as a free gift from the Imperial Army, and which saw rough usage in the late war, having become practically useless, it was proposed that Volunteers should in future purchase their own saddlery at a reduced rate and on easy terms of payment, as is the custom in Volunteer forces of the other Colonies. A universal saddle has therefore been approved, and the first supply of the new pattern issued.

A scheme for the formation of a reserve to be attached to the active corps has been formulated, which it is hoped will shortly come into force. By this means a man who finds that he is unable to devote the necessary time to ordinary volunteering will, providing he fulfils certain conditions, be able to keep himself in training as regards the use of the rifle, and this portion of the force should therefore prove a valuable asset in case of need; more especially so when a clause in the regulations will provide for the Volunteers and Reserve being called out prior to any other corps being formed.

During the financial year under notice a scheme of week-end bivouacs was brought into force, only the drills thus performed counting towards efficiency. They have been well attended and thoroughly enjoyable, and every care has been taken to prevent the drill and exercises being irksome.

A camp is held annually. The first, at Frederickstad, in the Western Transvaal, in April, 1904, was well attended, and was reported upon most favourably by the General Officer Commanding in South Africa. The total number of Volunteers present was 2,320. A great drawback to the site of this camp, however, was the distance which had to be travelled—some 80 miles— which necessitated far too much work in entraining and detraining. The second camp was held at Easter, 1905, at Irene, in the Pretoria district, and was attended by some 3,410 men. It was a greater success in every way, and, as the distance was considerably less, the men were able to arrive at their destination early in the evening after the conclusion of the last day's operations. At each camp the G.O.C., South Africa, has permitted certain technical corps, such as Royal Artillery and Royal Engineers, to attend, and in addition, at the Irene camp, arranged for the troops stationed at Pretoria to act as

VOLUNTEER HEADQUARTERS, JOHANNESBURG.

the opposing force in a combined field day, thus making the work more instructive and interesting.

THE CADETS.

The formation of Cadets was actually started in 1902, but the Cadet movement was only officially sanctioned in 1903, and was on the battalion system. This system was, however, found to be unsatisfactory, and accordingly, on the 1st November, 1905, the company system was started, which consists of school companies and companies for boys who have left school. There are at present 54 companies, with a total of 2,629 Cadets. The movement is a most popular one. The boys take a great interest in their drill, and at their annual camps do a good deal of work which is instructive.

TRANSVAAL HORSE ARTILLERY VOLUNTEERS.

This corps was raised on the 17th March, 1904, and was commanded by Major R. O. Godfrey Lys, who had as his adjutant Brevet-Major J. W. F. Lamont, of the Royal Field Artillery. The recruiting was very rapid, and at the end of June, 1904, the Corps numbered 70, out of a strength of 105. The efficiency was, in the first year, much hindered on account of there being no guns. Two unserviceable guns were eventually obtained on loan from the Army, for drill purposes. In January, 1905, Major Lys resigned, and the command was given to Major A. Langebrink. The Corps is now most efficient, and it is proposed to form a second battery in the near future. At the end of June, 1904, out of a strength of seventy, 64 were efficient, and at the end of June, 1905, of a strength of 95, the Corps had 87 efficients. The guns are drawn by a team of mules, which are led by a ridden pony on the near side. The uniform of the Royal Horse Artillery, substituting silver for gold, has been adopted as a full dress. The honorary Colonel of the Corps is Colonel T. Cullinan.

C.S.A.R. VOLUNTEERS' CAMP AT FREDERICKSTAD.

THE IMPERIAL LIGHT HORSE.

The I.L.H. was raised in December, 1902, from a nucleus formed by members of the irregular Corps bearing the same name. This corps has continued to recruit steadily. The first commanding officer was Lieut.-Colonel J. Donaldson, D.S.O., who had as an

adjutant Captain W. Jardine, D.S.O., both of whom were associated with the old Corps. In January, 1905, the strength was augmented by a squadron at Krugersdorp, which formerly belonged to the left wing of the Imperial Light Horse, on the formation of a Western District Corps, and which was not allowed to recruit in the Witwatersrand. In January, 1905, H.R.H. the Prince of Wales accepted the position of Colonel-in-Chief to the Regiment. Lieut.-Colonel Donaldson, D. S. O., resigned the command of the Corps on the 31st December, 1905, and was succeeded by Lieut.-Colonel W. T. F. Davies, D.S.O. The adjutant, Captain W. Jardine, D.S.O., was succeeded by Captain C. E. Rice, late of the Imperial Yeomanry, on the 1st October, 1905. The following comparative figures give the progress of the I.L.H. :—

Year.	Strength.	Efficients.
1902–3	327	320
1903–4	321	292
1904–5	358	277

CADET STAFF, 1905.

THE SOUTH AFRICAN LIGHT HORSE.

Raised in December, 1902, under the command of Lieut.-Colonel C. L. Anderson, this Corps made steady progress in recruiting in Johannesburg, East Rand, Heidelberg, and Vereeniging. In August, 1905, Lieut.-Colonel Anderson resigned, and Lieut.-Colonel W. F. Barker, D.S.O., assumed command. In January of the same year the Corps again suffered in strength on account of the transfer to the Eastern Rifles of the Vereeniging and Heidelberg squadrons. It is, however, now gradually getting stronger. Its adjutant is Captain W. Jardine, D.S.O., who was transferred from the Imperial Light Horse.

Year.	Strength.	Efficients.
1902–3	491	269
1903–4	264	182
1904–5	240	154

JOHANNESBURG MOUNTED RIFLES.

This Corps was raised in December, 1902, under the command of Lieut.-Colonel J. Dale Lace, with Major E. Vaughan, Manchester Regiment, as adjutant. On the formation of the Eastern Rifles it had to surrender its Standerton squadron, which naturally made a considerable decrease in its numbers. The Corps is recruiting rapidly on the Witwatersrand. As the following figures show, these recruits make up for the squadron so transferred.

Year.	Strength.	Efficients.
1902–3	436	371
1903–4	336	313
1904–5	288	273

TRANSVAAL HORSE ARTILLERY VOLUNTEERS, "A" Battery.
Inspection by COLONEL EDWARDS, late Commandant.

THE SCOTTISH HORSE.

Raised in the year 1902, from the nucleus of the old Scottish Horse, under the command of Lieut.-Colonel W. Dalrymple, with Captain R. M. Burgoyne, of the Scots Fusiliers, as adjutant. This Corps, which has made very good progress, is recruited only from those who are either Scotchmen or of Scottish descent, and has been largely assisted in its recruiting by the various local Caledonian Societies.

Year.	Strength.	Efficients.
1902–3	431	332
1903–4	306	291
1904–5	312	228

THE NORTHERN RIFLES.

Raised in the year 1903, under the command of Lieut.-Colonel G. C. Glyn, D.S.O. (Somerset Yeomanry), with his Excellency Sir A. Lawley as honorary Colonel. This Corps, which has made rapid progress, is composed of both mounted men and infantry. The headquarters are in Pretoria, and there are squadrons in almost every important outlying district.

Year.	Strength.	Efficients.
1903–4	499	317
1904–5	640	366

The number of inefficients is due to the fact that a good proportion of men were enrolled after the 31st March, and could not therefore make themselves efficient by the end of June in the same year, and of the delay in granting the sites for rifle ranges in the outlying districts.

THE WESTERN RIFLES.

Raised in December, 1902, as the Left Wing, Imperial Light Horse, under the command of Lieut.-Colonel H. Bottomley, C.M.G. This Corps experienced great difficulty in getting recruits excepting in the large towns of the district. Under the district system the Corps as the Left Wing, I.L.H., ceased, and received its present title, recruiting in the district west of Randfontein, thereby losing its squadron at Krugersdorp—which, as previously stated, was transferred to the Imperial Light Horse. Recruiting is still slow, but is improving gradually.

Year.	Strength.	Efficients.
1902–3	259	208
1903–4	289	210
1904–5	236	143

THE EASTERN RIFLES.

Raised in January, 1905, with Major R. E. Corbet as adjutant, and subsequently commanded by Lieut.-Colonel the Hon. H. Wyndham, with a nucleus formed by the transfer of squadrons of the Johannesburg

LT.-COL. J. DONALDSON, D.S.O.
O.C., Imperial Light Horse.

Mounted Rifles at Standerton and the South African Light Horse at Nigel, etc. This corps has recruited rapidly.

Year.	Strength.	Efficients.
1904–5.	258.	174.

THE CENTRAL SOUTH AFRICAN RAILWAY VOLUNTEERS.

Formed in December, 1902, under the command of Lieut.-Colonel T. R. Price, C.M.G., General Manager of the C.S.A. Railways. This Corps recruits only from railway employés, and is permitted on that account to recruit anywhere on the C.S.A.R. administration in the Transvaal. In 1904 Lieut.-Colonel Price, on account of his civil duties, resigned the command, and became honorary Colonel to the Corps, being succeeded by Lieut.-Colonel H. S. Greenwood, late of the Canadian forces. The Corps has equipment for three armoured trains, which are used from time to time, both for drill purposes and for field days.

Year.	Strength.	Efficients.
1902–3	710	283
1903–4	738	613
1904–5	569	472

The chief reason for the number of non-efficients in the year 1902–3 was on account of there being no rifle range at Pretoria.

OFFICERS OF THE TRANSVAAL HORSE ARTILLERY VOLUNTEERS, "A" BATTERY.

PRESENTATION OF COLOURS TO I.L.H. BY PRINCESS CHRISTIAN, September 28th, 1904.
(LIEUTENANT-COLONEL J. DONALDSON, standing; LIEUTENANT HARTE, kneeling.)

H.R.H. Princess Christian, in presenting the King's banners to the Regiment, addressed the banner escort in the following terms: "Yours was the first Volunteer Regiment formed at the commencement of the late war. Your record throughout that prolonged struggle was unsurpassed. In presenting you this standard, which my brother the King has been pleased to direct is to be entrusted to your care, I know it will be zealously and carefully guarded, and I trust it will help to emulate those that join your regiment to maintain its unblemished name for heroism and patriotism."

OFFICERS OF THE NORTHERN RIFLES.

Group taken at the Camp at Irene, near Pretoria, 1905.

MAJOR BROWNE, Staff Officer of the Northern Transvaal Volunteer District, ninth from left, standing.

THE TRANSVAAL LIGHT INFANTRY.

Raised in December, 1902, under the command of Sir Godfrey Lagden, K.C.M.G., who was succeeded in 1904 by Major R. W. Schumacher, who again was succeeded by Lieut.-Colonel J. J. Furze. This Corps, which has steadily grown in numbers, recruits in Johannesburg only. It has a Post and Telegraph Company and an Engineer Company. A Pigeon-Post section is being formed.

Year.	Strength.	Efficients.
1902–3	419	316
1903–4	442	355
1904–5	519	386

THE TRANSVAAL SCOTTISH.

Raised in December, 1902, under the command of Lieut.-Colonel Gordon Sandilands, this Corps has progressed favourably. It recruits, like the Scottish Horse, from Scotchmen or those of

Scottish descent. It is a kilted regiment, wearing the Athol tartan. The Corps is assisted largely by the local Caledonian Societies.

Year.	Strength.	Efficients.
1902–3	411	313
1903–4	561	514
1904–5	583	448

MAJOR MERCER,
Adjt. C.S.A.R.V. (Johannesburg).

THE WITWATERSRAND RIFLES.

Raised in December, 1902, as the Railway Pioneer Regiment, the title of this Corps was changed in 1903, the command being undertaken by Lieut.-Colonel J. G. Hamilton, M.V.O., who subsequently handed over the command to Lieut.-Colonel T. M. Macfarlane, C.M.G., and assumed the title of honorary Colonel. The Rifles recruit from amongst mine employés. The Corps suffers much from the necessary moving of men from one mine to another, and also from the fact that miners have very little time to devote to volunteering on account of the nature of their work.

Year.	Strength.	Efficients.
1902–3	174	104
1903–4	475	360
1904–5	417	336

THE TRANSVAAL VOLUNTEER MEDICAL STAFF CORPS.

Raised in 1903, under the command of Lieut.-Colonel D. W. Johnston, this Corps recruited very rapidly indeed, being now thoroughly efficient in its duties. The course for efficiency, as will be seen from attached tables, is rather more severe than in other corps.

Year.	Strength.	Efficients.
1902–3	38	18
1903–4	358	261
1904–5	444	401

The Corps is up to its full strength. Attached to it is a Nursing Sisters Reserve of a matron and 25 sisters, all of whom are thoroughly qualified to take their places when required.

THE TRANSPORT CORPS.

This Corps, which was raised in 1903 from the employés of the Cartage Department, C.S.A.R., by Major C. E. S. King, has proved a very valuable asset to the Volunteer Force.

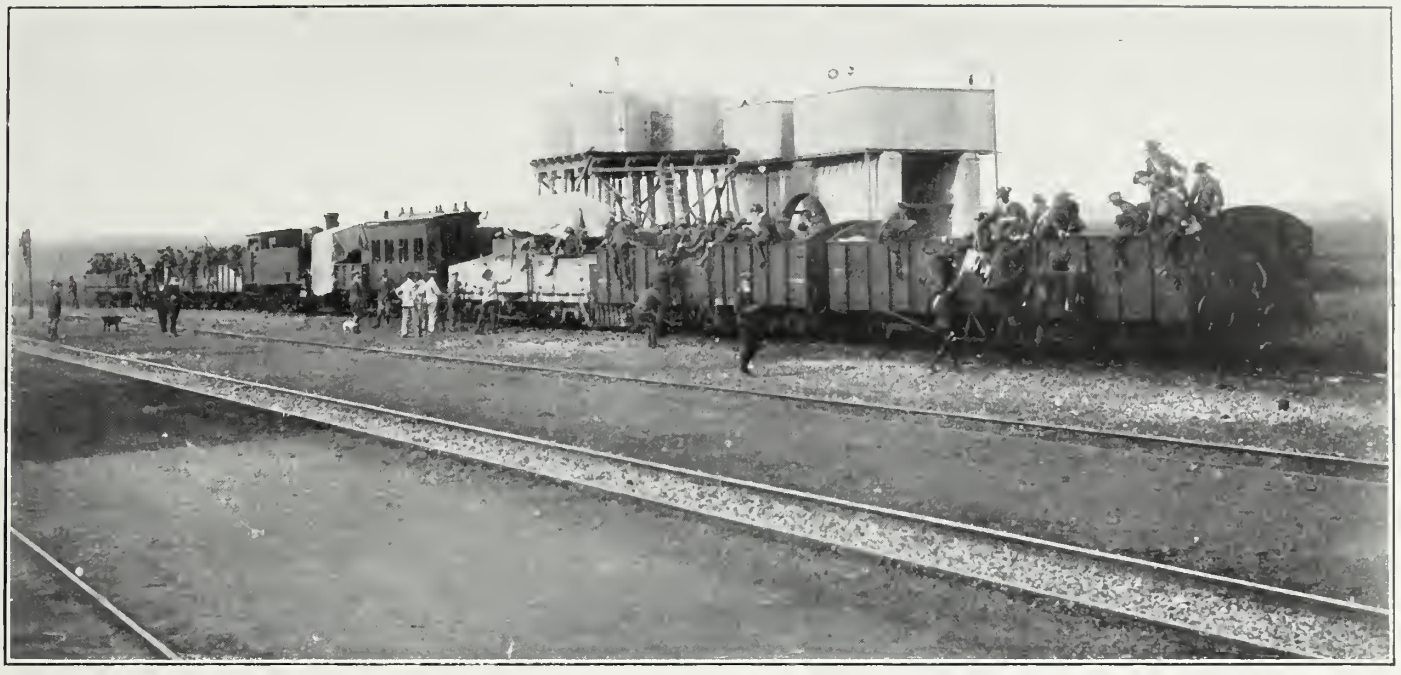
TRANSVAAL CYCLE AND MOTOR CORPS.

Raised in February, 1906, from the nucleus of a Cyclist Company of the Transvaal Scottish Volunteers, under the command of Lieut.-Colonel H. A. Woolf, this Corps is now 267 strong, and promises to be a great success. Field-Marshal H.R.H. the Duke of Connaught and Strathearn, K.G., etc., etc., Inspector-General of the Forces, has been graciously pleased to become Colonel-in-Chief of the Corps.

TRANSVAAL BISLEY.

A Transvaal Bisley Meeting has been held since 1903, on lines similar to that in England. It is well patronised by members of the Colonial Forces from Rhodesia, Natal, and Cape Colony, in addition to the large number of local competitors. The shooting is very keen, and the meeting draws a considerable number of visitors. The principal event is the "Governor's Cup," which is fired in three stages, the highest in 1st stage receiving a bronze medal, 2nd stage silver medal, and the final stage gold medal and £50. Up to the present a Transvaal man has won the premier prize each year. Another event which arouses interest is the competition for the great Inter-Colonial Shield, which is shot for by teams of 15 from each Colony. Some very keen shooting takes place, and the scores of each are awaited anxiously by the onlookers. The Transvaal team, under the Captainey of Major C. E. Collard, the Staff Officer for Musketry of the Transvaal Volunteers, has so far been successful in winning this important event, and much of their success is due to the untiring efforts of the above-named officer, by personal example, to keep up the standard of shooting in the Transvaal. As honorary secretary of the Transvaal Bisley, also, Major Collard has worked hard to make each meeting a success. Regret was expressed that he was leaving to rejoin his Corps.

OFFICERS OF THE C.S.A.R. VOLUNTEERS, 1905.



C.S.A.R. VOLUNTEERS (Manning an Armoured Train).

Inspection by Field-Marshal H.R.H. the Duke of Connaught and Strathearn.

On the 10th February, 1906, His Royal Highness inspected the Force at Johannesburg, on the occasion of a field day. At the conclusion of the day's operations, the Force, under the Commandant, marched past in column of route. His Royal Highness was very pleased with the turn out, as will be seen from the following congratulatory letter which was received subsequent to the inspection :—

"Field-Marshal H.R.H. the Duke of Connaught desires me to say that he appreciates the compliment in being asked to inspect the parade of Volunteers held on the 10th inst. He congratulates Colonel Briggs, the officers, N.C.O.'s, and men of the Witwatersrand Volunteers on their creditable muster. H.R.H. was particularly pleased to notice representatives of all arms, of Medical Corps, Engineers, Transport, and armoured trains present on parade. The mounted Corps were well horsed; the equitation, marching, and physique left little to be desired. Arms, clothing, and equipment were serviceable. At manœuvre all arms were well handled, and the men worked very intelligently. It was noticeable that all arms turned out as they should do—*i.e.*, ready for active service. H.R.H. feels convinced that the Witwatersrand Volunteers are rightly proud of their workmanlike and serviceable condition. Indeed, it was difficult for him to realise that he was inspecting Volunteers—not regular troops. He congratulates all ranks on this result, and sees no reason why (provided the same high standard and keenness are maintained) the Transvaal Volunteers should not develop into as efficient a fighting force as any in the Empire. The Duke of Connaught also desires to congratulate all concerned on the very large muster of Cadets. It gave him great plea-

MEDICAL STAFF CORPS (JOHANNESBURG).

sure to see them on parade, and to note how well they drilled and marched. He feels confident that, as they grow up, they will look back with pride on their connection with the Cadet Corps and will, in their turn, take their places in the ranks of the Transvaal Volunteers, and prove themselves worthy of the honour of serving their King."

(Signed) J. G. MAXWELL, Brigadier-General.
Staff Officer to H.R.H.
The Inspector-General of the Forces.

Johannesburg, Feb. 11th, 1906.

[The editor had hoped to publish a plate of the various full-dress uniforms now being taken into use in the Transvaal Volunteer Force, but the details were not ready at the time of going to press.]

FIRST TRANSPORT CORPS (TRANSVAAL), 1905.

SCALE OF DRILLS AND MUSKETRY PRACTICES.

(1) Mounted Corps and Transport Corps (except Artificers of the latter).

A.	A complete year from 1st July	18	Drills.
B.	Nine months and over, but under twelve months...	18	,,
C.	Nine months and over, but under twelve months...	14	,,
D.	Six months and over, but under nine months ...	6	,,
E.	Three months and over, but under six months ...	1	,,

(2) Infantry Corps and Cyclists.

A.—	A complete year from 1st July...	12	Drills.
B.—	Nine months and over, but under twelve months...	12	,,
C.—	Nine months and over, but under twelve months...	9	,,
D.—	Six months and over, but under nine months ...	6	,,
E.—	Three months and over, but under six months ...	1	,,

(3) Medical Staff Corps.

A.	A complete year from 1st July	Six drills, six lectures and three bearer company praetiees.
B.	Nine months and over, but under twelve months ...	Six drills, six lectures and three bearer company practiees.
C.	Nine months and over, but under twelve months ...	Four drills, four lectures and two bearer company practiees.
D.	Six months and over, but under nine months ...	Three drills, three lectures and two bearer company praetiees.
E.	Three months and over, but under six months ...	Two drills, two lectures and one bearer company praetice.

(4) Artillery Corps (including Drivers (native), &c.)

A.—	A complete year from 1st July	Twenty-four battery drills, six of which must be with blank.
B.—	Nine months and over, but under twelve months ...	Twenty-four battery drills, six of which must be with blank.
C.—	Nine months and over, but under twelve months ...	Nineteen battery drills, five of which must be with blank.
D.—	Six months and over, but under nine months ...	Twelve battery drills, three of which must be with blank.
E.—	Three months and over, but under six months ...	Seven battery drills, two of which must be with blank.
F.—	Under three months	Seven battery drills, two of which must be with blank.

(5) Signalling Corps.

(*a*) Drill— Recruits' course (until passed by Adjutant of Corps or S.O. Signalling).

(*b*) Musketry course as laid down for recruits and trained Volunteers.

(*c*) In lieu of ordinary efficiency drills, a signaller will, in the first instance, be trained as such by the staff officer for signalling.

MUSKETRY RETURN—TRANSVAAL VOLUNTEERS—1904–1905.

Out of a total of 4,528 Volunteers eligible for musketry practice, 3,524 were fully exercised, the classification being as follows :

Marksmen	110
First-class Shots	279
Second-class Shots	376
Third-class Shots (including those partly exercised)	2,664
Non-efficient (including those not exercised)	1,099

Unit.	Total strength on 30-6-05.	Number fully exercised in musketry.	Classification.					Remarks.
			Marksmen.	First-class shots.	Second-class shots.	Third-class shots.	Non-efficient.	
Transvaal Horse Artillery Volunteers ...	95	88	2	12	27	47	7	Revolver efficiency ; only Artillery permanent escort use the rifle.
Imperial Light Horse Volunteers	358	277	8	23	29	99	199	
South African Light Horse	240	151	6	9	17	123	85	
Johannesburg Mounted Rifles	288	266	2	13	33	240	...	
Scottish Horse	312	226	13	17	28	168	86	
Northern Rifles	640	440	5	17	27	398	193	
Western Rifles	236	144	2	3	12	127	92	
Eastern Rifles	258	236	0	4	19	195	40	
Central South African Railway Volunteers	569	496	10	38	45	403	73	
Transvaal Light Infantry	549	386	23	38	31	294	133	
Transvaal Scottish	583	443	27	59	71	291	135	
Witwatersrand Rifles	417	363	12	46	36	272	51	
Victoria Cape Mounted Signallers	13	8	...	...	1	7	5	
Totals	4,528	3,524	110	279	376	2,664	1,099	

(Note.—Included in third-class shots are those men who made themselves efficient for the period of their service under twelve months.)

For comparision with the above results the following summary of the musketry returns of the Transvaal Volunteers for 1902–3 and 1903–4 are of interest :

	1902–3	1903–4
Total strength	3,781	
Total number fully exercised in musketry	767	3,802
Marksmen	13	64
First-class shots	62	301
Second-class shots	119	394
Third-class shots	549	3,034
Non-efficients	24 (*i.e.* 3·1 per cent.)	9 (*i.e.* ·002 per cent.)

Total number of non-efficients and those not fully exercised in musketry, 859.

The percentage of non-efficients in 1904–5 was 3·1.

MUSKETRY.

Trained Volunteers' Course (all Arms) and Medical Staff Corps (optional) and Transport Corps (all Ranks).

Description of Fire.	Description of Target.	Distance in yards.	Number of rounds.	Position.	Remarks.
Individual Deliberate	3rd Class. 2nd Class. Ditto.	200 500 600	1 sighter and 7. Ditto. Ditto.	Any military. Ditto. Ditto.	This constitutes one Bisley shoot, and has to be repeated three times during each Volunteer year.
Rapid Independent	2nd Class (Bisley).	500	10	Ditto.	The target will appear for one minute and twenty seconds. Firing must be from the magazine. Scoring will be by total value of the ten shots, according to the division of target they strike, only direct hits to count. Shooting in this practice must be through the "V."
Snap Shooting	Figure of head and body of man (Fig. 3, Army Musketry Regns., 1903.)	200	10	Ditto.	The target will appear ten times for four seconds, each time with intervals of disappearance of four seconds. Firing must be from the magazine, and direct hits only to count. Value of hits on the figure, five points each. Shooting in this practice must be through the "V."

Classification.—Marksmen, 375 ... 2nd-class, 290
1st-class, 330 ... 3rd-class, 160

To qualify in any of these classes a Volunteer must select three of his Bisley shoots, one of his snap-shooting shoots at 200 yards, and one of his rapid independent shoots at 500 yards.

(N.B. There is no objection to a Volunteer firing two or more shoots in one day, but one shoot must be fully completed before another is commenced.)

MUSKETRY.

Recruits' Course (all Arms) and for Medical Staff and Transport Corps.

Description of Fire.	Description of Target.	Distance in yards.	Number of rounds.	Position.	Remarks.
Individual...	Third-class ...	200	1 sighter and 20	Any military...	Should a recruit at this stage fail to make 40 points out of a possible 100, he will, after further instruction, fire again; if he fails again, he will fire a third time. Failing to score the requisite number of points will necessitate discharge.
Deliberate...	First-class ...	500	Ditto	Ditto	If, after making 40 points at 200 yards, a recruit is unable to make up his total points to 80, after three attempts at 500 yards, he will be discharged from his Corps as unlikely to become an efficient Volunteer. To qualify, therefore, as an efficient recruit, a member must make a total of 80 out of the above 200 points, and until he has qualified as such he cannot carry out the course laid down for a trained Volunteer.

MUSKETRY.

Musketry Course for Cadets.

Description of Fire.	Description of Target.	Distance in yards.	Number of rounds.	Position.	Classification.	Remarks.
Individual...	Second-class	200	1 sighter and 9 shots at each distance.	Any military	Marksman, 85 points. First-class shot, 75 ,, Second-class ,, 65 ,, Third-class ,, 35 ,,	A Cadet may fire as often as he likes at each range, and his two highest scores, one at each range, will be added together for the purpose of classification. Only those Cadets classed as "capable of bearing arms" are to undergo the course of musketry. The minimum number of points which a Cadet must make to pass is 35.
Deliberate...	First-class...	500				

Cost of Maintenance of the Transvaal Volunteer Force from Inception.

Financial Year.	£	s.	d.
1902 1903	99,072	0	0
1903 1904	113,396	11	4
1904 1905	114,080	15	8

RETURN OF TRADES AND OCCUPATIONS REPRESENTED IN THE TRANSVAAL VOLUNTEER FORCE.

1903-4.

Corps.	Employees on Mines.	Clerks and Storekeepers.	Farmers and Settlers.	Artisans.	Miscellaneous.	Totals.
Right Wing, Imperial Light Horse	77	80	6	73	94	330
Left Wing, Imperial Light Horse	30	70	94	39	42	275
South African Light Horse	69	79	24	37	60	269
Johannesburg Mounted Rifles	40	106	12	123	33	314
Scottish Horse	130	67	35	60	16	308
Central South African Railway Volunteers	...	237	...	384	182	803
Transvaal Light Infantry	6	167	1	176	73	423
Transvaal Scottish	96	201	...	217	36	550
Witwatersrand Rifles	435	11	1	16	6	469
Northern Rifles	1	209	89	60	140	499
Volunteer Medical Staff Corps	48	162	1	76	47	334
Lys' Volunteer Corps	...	46	...	...	24	70
Totals	932	1,435	263	1,261	753	4,644

1904-5.

Unit.	Mine Employees.	Farmers and Settlers.	Clerks and Storekeepers.	Artisans.	Miscellaneous.	Total Strength.
Transvaal Horse Artillery Volunteers	...	2	40	...	53	95
Imperial Light Horse	91	7	96	87	77	358
South African Light Horse	91	7	63	55	24	240
Johannesburg Mounted Rifles	43	6	72	106	61	288
Scottish Horse	127	60	50	38	37	312
Northern Rifles	46	161	190	111	129	640
Western Rifles	4	97	69	33	33	236
Eastern Rifles	16	81	32	72	57	258
Central South African Railway Volunteers	...	...	154	115	...	569
Transvaal Light Infantry Volunteers	9	1	208	257	44	519
Transvaal Scottish	98	...	183	252	50	583
Witwatersrand Rifles	392	...	10	9	6	417
Transvaal Volunteer Medical Staff Corps	88	...	135	57	164	444
Victoria Cape Mounted Signallers	1	...	1	4	7	13
Transport Corps	...	...	...	...	58	58
Totals	1,006	125	1,303	1,496	800	5,030

SCALE OF DRILLS FOR CADETS.

	Drills.	Capitation. Class "A."		Class "B."
A complete year from 1st July	30	£2.	...	£1.
Nine months and over, but under 12 months	30	£2.	...	£1.
Nine months and over, but under 12 months	20	£1 10s.	...	15s.
Six months and over, but under 9 months	15	£1.	...	10s.
Three months and over, but under 6 months	8	10s.	...	5s.

Note. Class "B" is a Cadet who is unable to bear arms, and will not therefore be required to undergo a course of musketry.

Legal.

THE LAW.

THE Law of the Transvaal is founded upon the Roman-Dutch Law as it existed in Holland at the beginning of the nineteenth century. As the Dutch found it necessary from time to time to modify and add to the Roman Law, so in this country the Roman-Dutch Law has been modified and enlarged. With the development of commerce and the many changes effected in consequence of great discoveries and inventions, relations between men have become more and more complex. New rights and corresponding obligations have been recognised, and the Law has grown and developed. This growth has taken place chiefly by the efforts of the legislators, and to some extent by the decisions of the judges. Much English Law has been engrafted on the Statute Book, especially in the domain of Commercial Law. Thus the English Bills of Exchange Act has practically been taken over *en bloc*. The Land Laws are not nearly so complex as those of the mother land, and the system of Land Transfer and Registration is here found to work simply and inexpensively. The Transvaal Company Laws are not nearly so satisfactory, but a new statute has been drafted, and the English Law dealing with this important subject is about to be adopted. The law relating to Insolvency is substantially the same as that which is in force in all the South African Colonies. It requires some amendments, which are now under consideration. The Criminal Law is materially the same as in England—perhaps simpler, and with fewer technicalities.

Evidence is deduced in the Transvaal Courts according to the English rules. In no civil action are the services of a jury engaged, but in criminal cases the issue is decided by the unanimous decision of nine "good men and true."

JUDICIARY.

The Courts.

(A) *The Privy Council.*—The Judicial Committee of the Privy Council is the ultimate court of appeal from the decisions of the Supreme Court of the Transvaal. To entitle a litigant to appeal to the Privy Council the decision of the Supreme Court must involve directly or indirectly rights to the value of £2,000, or else leave to appeal must be obtained from the Privy Council.

(B) *The Supreme Court.*—The Supreme Court sits at Pretoria either as a court of appeal or as a court of first instance, and has jurisdiction over the whole of the Transvaal. (a) *As a Court of Appeal:* The Supreme Court sits to hear appeals from the decisions of a single judge in a Divisional Court, of the Witwatersrand High Court, of the Magistrates' Courts, and of other inferior Courts. The Court as a rule consists of three judges, but sometimes when hearing appeals from Magistrates only of two. Besides acting as a court of appeal, the Supreme Court has full power to review the proceedings of all inferior Courts within the Colony. This power of review is often exercised by one judge alone. (b) *As a Court of First Instance:* The Supreme Court also sits to try cases in the first instance. Sometimes important cases are so tried by three judges, in other and less important ones by one judge sitting in a Divisional Court. Where three judges sit in the first instance, there is no appeal from their decision to the Supreme Court, but only to the Privy Council.

(C) *The Witwatersrand High Court.*—The Witwatersrand High Court sits at Johannesburg, and has jurisdiction only over the Witwatersrand district. All civil cases are heard before a single judge, and all criminal cases before a judge and jury. The judges of the Supreme Court are also judges of this Court, and each judge in rotation sits for a month at a time. From the decision of the Court there is an appeal to the Supreme Court. The time of this Court is generally very busily occupied, as by far the largest amount of important litigation in the Colony arises within the Witwatersrand. *Terms:* The civil terms of the Supreme Court and the Witwatersrand High Court coincide. There are two terms each year, beginning on the 1st March and the 1st August respectively and ending on the 30th June and the 30th November respectively. The winter vacation lasts during July, and the Long Vacation from the beginning of December to the end of February. The Criminal Sessions of the Supreme Court are six, and start on the 15th day of every other month, the first beginning in January. The corresponding Sessions of the High Court are of a like number, but start on the first day of every other month, beginning in February. In practice the Criminal Court in Johannesburg sits almost continually throughout the year.

(D) *The Circuit Courts.*—There are four Circuit Courts in the Transvaal: (1) the Northern Circuit Court, held at Pietersburg; (2) the Southern Circuit Court, held at Standerton; (3) the Eastern Circuit Court, held at Middelburg; (4) the Western Circuit Court, held at Potchefstroom. The Courts sit twice each year, and exercise within their respective districts a concurrent jurisdiction with the Supreme Court. The judges of the Supreme Court are also judges of the Circuit Courts.

The Judges.

At the time of writing, His Majesty's judges in the Transvaal number seven. They hold office direct from the Crown, and are appointed under the hand and seal of the Governor. Each appointment is for life, and a judge may only be suspended by the Governor upon proof of misconduct. Moreover, such suspension is subject to the confirmation of the King in Council, and a judge may only be removed from office upon proof of misconduct to His Majesty in Council.

The Hon. Sir James Rose-Innes, the Chief Justice, was born on the 8th January, 1855, at Grahamstown, in the Cape Colony. He was one of the pupils of the late Robert Templeton, sometimes termed the Arnold of South Africa. He graduated as a B.A. and LL.B. of the University of the Cape of Good Hope, and was called to the Cape Bar in February, 1878. Unlike most members of the "honourable and learned" profession, Mr. Innes (as he then was) escaped the long and weary waiting interval, and soon obtained a large practice. All his time, however, was not devoted

exclusively to the law. He was a keen politician, and in 1884 was returned to the Cape House of Assembly as representative for Victoria East. When

HON. SIR JAMES ROSE-INNES,
Chief Justice of the Transvaal.

he lost that seat, four years later, he was elected as the representative of the Cape Division, and continued as such representative till his acceptance of the highest judicial office in the Transvaal in 1902. Mr. Innes "took silk" in 1890, and during the same year became Attorney-General in the first Rhodes Ministry. He retired from office in 1893, but became Attorney-General again in 1900, when he joined the fourth Sprigg Ministry. In 1901 he was created a K.C.M.G., and early in the following year became Judge President of the High Court of the Transvaal, being shortly afterwards, on the creation of the Supreme Court, appointed Chief Justice. Sir James married a daughter of the late D. Pringle, Esq., of Bedford, Cape Colony, by whom he has issue one daughter.

The Hon. Mr. Justice W. H. Solomon, the first Puisne Judge, was born at Philippolis, in the Orange River Colony, on the 25th September, 1852. He was a pupil of the late Robert Templeton, at Bedford, Cape Colony, and then went to the South African College. In 1871 he graduated B.A. at the Cape University, gained the Porter Scholarship, and proceeded to Peterhouse College, Cambridge. After graduating in mathematics he was in 1876 called to the Bar by the Benchers of the Inner Temple. Before returning to the Cape he read in chambers as a pupil of the present Mr. Justice Jelf. In 1876 Mr. Solomon was admitted to practice as an advocate before the Supreme Court of the Cape of Good Hope, and, whilst at the Bar, for some time was Assistant Law Adviser to the Crown. During the year 1888 Mr. Solomon was elevated to the Bench, and for many years sat as a judge, first at Kimberley and later at Grahamstown. In 1900 Mr. Justice Solomon became President of the Special

HON. MR. JUSTICE W. H. SOLOMON,
First Puisne Judge.

Treason Court in the Cape Colony, and early in 1902 accepted the position he now holds. Mr. Justice Solomon is married to a daughter of H. B. Christian, Esq., of Port Elizabeth, Cape Colony.

The Hon. Mr. Justice J. W. Wessels, the second Puisne Judge, was born in Capetown, in March, 1862. He was educated at the South African College School, and later at the South African College. In 1882 he became B.A. of the Cape University, and won the Jamison Scholarship. He proceeded to Downing College, Cambridge, and in 1885 obtained a first class in the Law Tripos and the George Long Scholarship for Roman Law. After reading in chambers at the Middle Temple, he was called to the Bar in 1886, and then returned to the Cape. Mr. Wessels joined the Transvaal Bar in 1887, and soon obtained a large and lucra-

HON. MR. JUSTICE J. W. WESSELS,
Second Puisne Judge.

tive practice. During the Boer War Mr. Wessels for some time acted as legal adviser to Lord Roberts, and afterwards to Lord Kitchener. In 1902 he accepted a seat on the Transvaal Bench.

The Hon. Sir William Smith, Kt., the third Puisne Judge, was born at Cheltenham, Gloucestershire, in 1853. He went to Trinity Hall, Cambridge, and graduated B.A. in 1875. The same year he was called to the Bar at Lincoln's Inn. He became LL.M. of Cambridge in 1878, and after practising for some time at the English Bar in 1882 accepted a puisne judgeship in Cyprus. In 1892 he was appointed Chief Justice of that island, and was knighted in 1896. He transferred his services as Chief Justice to British Guiana in 1897. During the Boer War he acted as President of the Natal Special Treason Court, and in 1902 assumed his present position. He is married to a daughter of Major Edward Marsh, and has several children.

The Hon. Mr. Justice Mason, the fourth Puisne Judge, was born at Palmerston, Pondoland, in 1860. He was educated at New Kingswood College, Bath, and at New College, Eastbourne. In 1879 he became a B.A. of London University, and shortly afterwards returned to South Africa. He was admitted as an advocate and solicitor of Natal in 1881, in that Colony the two branches of the legal profession being assimilated. He practised as an advocate and solicitor till 1896, when he was elevated to the

Natal Bench. During the Boer War he was a member of the Natal Special Treason Court, and towards the end of 1902 accepted a judgeship in the Transvaal. He is married to a daughter of John Harwin, Esq., of Pietermaritzburg, and has three children.

The Hon. Mr. Justice Bristowe, the fifth Puisne Judge, was educated at Westminster School and Christ Church, Oxford, where he graduated in due course. He was called to the Bar at the Inner Temple in the Trinity Term of 1882, and practised at the Chancery Bar. Mr. Bristowe (as he then was) jointly edited the second edition of McSwinney on "Mines." In 1903 he was offered and accepted a judgeship on the Transvaal Bench. Mr. Justice Bristowe is married, and has several children.

The Hon. Mr. Justice Curlewis, the sixth Puisne Judge, was born at Paarl, Cape Colony, in 1863. He was educated at the Diocesan College, Rondebosch, Cape Colony, from whence he graduated B.A. of the Cape University in 1881. After teaching for a short period, he joined the Cape Civil Service. However, in 1887 he passed

HON. MR. JUSTICE CURLEWIS,
Sixth Puisne Judge.

the Cape LL.B., and in the same year was admitted to practise as an advocate before the Supreme Court of the Cape of Good Hope. The following year he joined the Transvaal Bar, and soon acquired a considerable practice. In 1899 he acted as a Judge of the High Court of the late Transvaal Republic. He resumed practice after the War, and was elevated to the Bench at the end of 1903. He is married to a daughter of J. H. Booysen, Esq., Graaff-Reinet, Cape Colony, and has several children.

Practitioners.

The legal practitioners in the Supreme and High Courts consist of Advocates and Attorneys. The two branches of the profession are quite distinct, and no person can at one and the same time practise as an advocate and an attorney. In this respect the English practice is strictly followed.

(a) *Advocates.*—Every English and Irish barrister and Scotch advocate is entitled to be admitted to practise as an advocate in the Transvaal. The advocates of the High Court of the late South African Republic are qualified for admission, and so are the advocates of any Colony of British South Africa, provided they practised as such for seven successive years prior to the 10th April, 1902. Advocates of the Supreme Court of any British Colony are conditionally entitled to admission. The conditions are that they have passed an examination which has been declared by Proclamation of the Governor in the *Gazette* to be equivalent to that of the examination for the degree of Bachelor of Laws in the University of the Cape of Good Hope, and have for seven successive years practised in the Supreme Court of such Colony exclusively as advocates and not in partnership with any attorney. Further, any person may qualify for admission by passing the requisite examination prescribed by notice in the *Gazette*. The examination for the degree of LL.B. of the Cape University has been declared to be such an examination.

In the Transvaal the Bar is organised in a voluntary association called the "Order of Advocates." This Society has a constitution of its own, and yearly it elects a Bar Council, which regulates matters of professional conduct and generally looks after the interests of the Bar. This Council has certain disciplinary powers over the members of the "Order." At the time this is written there are about 70 advocates practising in the Transvaal, besides a large number of others who are not actively engaged in their profession. The recognised leader of the Bar is the Attorney-General, who is also the chief law officer of the Crown.

The Hon. Sir Richard Solomon, K.C.M.G., C.B., K.C., is the present Attorney-General. He was born at Capetown in 1850, and is an elder brother of Mr. Justice Solomon. He was one of a famous band of pupils of the late Robert Templeton, and sub-

THE HON. SIR RICHARD SOLOMON,
K.C.M.G., C.B., K.C.,
Acting Lieutenant-Governor
(Attorney-General).

sequently was educated at the South African College. He proceeded to Peterhouse College, Cambridge, in 1871, and in 1875 passed 23rd wrangler in the Mathematical Tripos. He then taught mathematics at the Naval College, Greenwich, and at the same time kept his terms at the Inner Temple. In 1879 he was called to the Bar by the Benchers of his Inn, and during the same year he returned to South Africa. He joined the Bar of the Eastern Districts Court, and soon became prominent in his profession. In 1882 he acted as a member of the Government Commission on Native Laws and Customs, and in 1886 was appointed legal adviser to the Royal Commission which investigated the administration of Mauritius. During 1887 he was elected to the Cape House of Assembly as member for Kingwilliamstown, but lost his seat at the next election. He joined the Kimberley Bar in 1889, and was elected again to the Assembly as a member for that place in 1892. In 1896 he defended the Reform prisoners in conjunction with the present Mr. Justice Wessels. Tembuland returned him as its representative to the House

of Assembly in 1897, and in the following year he became Attorney-General in the Scheiner Ministry. In 1900 he resigned, and not long after was appointed Legal Adviser to the Transvaal Administration. In 1901 he was made a K.C.M.G., and in 1902 Attorney-General of the Transvaal and a member of the Executive and Legislative Councils. On the retirement of Viscount Milner, Sir Richard for several months acted as Lieutenant-Governor, and on Sir Arthur Lawley's departure was again appointed to act in the same capacity. In 1905 he was made a K.C.B. Sir Richard Solomon is married to a daughter of the late Rev. J. Walton, and has one daughter.

The Hon. James W. Leonard, K.C., is the leading member of the legal practitioners in the Transvaal. He

HON. JAMES W. LEONARD, K.C., Leading Member of the Legal Practitioners of the Transvaal.

(Photo: Duffus Bros., Johannesburg.)

was born at Somerset East, Cape Colony, in 1853, and like so many of South Africa's foremost legal men was a pupil of the late Robert Templeton. Later he attended at Gill College, Somerset East. For a time he took to journalism, and edited the *Richmond Era*. In 1876 he passed the Cape LL.B., and was admitted to practice as an advocate before the Supreme Court. He at once obtained a large practice. In 1879 he was elected to represent Oudtshoorn in the Cape House of Assembly, and he continued to sit as a member for that constituency till 1888. At the age of 28 he became Attorney-General, and at 30 he "took silk." He joined the Transvaal Bar in 1888, and became an advocate for the rights of the "uitlander." As one of the "Reformers" he was sentenced to pay a fine of £2,000 and to be imprisoned for two years. After being in the Pretoria gaol for several weeks he was liberated, and proceeded to London, where in 1897 he was called to the Bar at the Middle Temple. In 1902 he returned to the Transvaal and resumed practice. He is still a keen politician, and a prominent member of the Progressive party. Mr. Leonard is married, and has a son.

(b) *Attorneys.*—The provisions with regard to the admission of attorneys are contained in Sec. 11 of Proclamation 14 of 1902, Ordinance 1 of 1904, and Secs. 7 and 8 of Ordinance 31 of 1904. In short, any attorney or solicitor practising in the United Kingdom or in the Cape Colony is entitled to be admitted to practice in the Transvaal. Attorneys and solicitors of any British colony are qualified for admission, if they served articles for at least three years before being admitted in such Colony, and have for seven successive years practised there as attorneys or solicitors. An advocate of the Supreme Court is entitled to be admitted to practice as an attorney, provided he has not practised as an advocate during the six months immediately preceding his application for admission. Other persons can qualify by serving articles in the office of a qualified attorney for a period of three years and passing the prescribed examination in law and jurisprudence. The lawyers in the Transvaal are organised into a statutory body known as the "Incorporated Law Society of the Transvaal." The rules governing their professional conduct and status are contained in Private Ordinance No. 1 of 1905, and the regulations made thereunder. The Council which administers the affairs of the Incorporated Law Society is elected annually. For the year 1905–6 Mr. Edward Rooth, of Pretoria, is President, and Mr. W. Somerset Bell, of Johannesburg, is Vice-President of the Council. There are about 500 attorneys in the Transvaal, but a good many of these gentlemen are not active practitioners.

(c) *The Courts of Resident Magistrates.*—The Transvaal is divided up into sixteen magisterial districts, in each of which there is a Resident Magistrate and one or more Assistant Resident Magistrates. All Magistrates are stipendiary. The Magistrates have a very extensive civil jurisdiction. They may try actions instituted against persons residing or carrying on business within their districts and actions relating to landed property situate within such districts. Their power extends to the hearing and deciding of (i) cases founded upon "liquid documents" in which the amount claimed does not exceed £500, exclusive of interest, (ii) illiquid demands for the recovery of the purchase price of goods up to £250, (iii) all other cases in which the claim or matter in dispute does not exceed £100, including actions for ejectment. The criminal jurisdiction of the Magistrates extends to all cases of crimes and offences wherein any person may be accused of any crime or offence not punishable by death, transportation, or banishment. A Magistrate may for each offence impose a fine not exceeding £75 and/or imprisonment for a period not exceeding six months with or without hard labour. In the case of a second or subsequent conviction for a crime within the space of three years, a Magistrate may order the infliction of not more than twenty-five lashes, but in such a case the sentence is conditional upon confirmation by a judge of the Supreme Court. In all cases of a serious nature the Magistrate holds a preliminary inquiry, and either releases the prisoner or commits him for trial before a superior court. Besides Advocates and Attorneys, Law Agents of the old Landdrosts' Courts of the late Republic are entitled to practice in the Courts of Resident Magistrates. With the disappearance of these gentlemen in the course of time, this class of practitioner will cease to exist.

(f) *The Courts of the Commissioners and Sub-Commissioners of Natives.*—These Courts were established by Law 4 of 1885. The Commissioners and Sub-Commissioners have jurisdiction to try and decide all civil disputes between natives according to the provisions of Law 4 of 1885 and Native Laws and Customs, provided such be not contrary to the principles of civilisation. These officers have also jurisdiction to decide questions of dispute between natives and white persons, where such questions are referred to them by such white persons. In the latter cases the ordinary law is applicable. The Commissioners and Sub-Commissioners have also certain limited criminal jurisdiction. The jurisdiction of each Commissioner and Sub-Commissioner is confined within the limits of his district.

(g) *The Courts of the Superintendent and Inspectors of the Foreign Labour Department.*—These Courts were estab-

lished by Ordinance 27 of 1905, and the jurisdiction thereby conferred is a purely criminal one. The Superintendent and Inspectors have jurisdiction to try Chinese labourers for (i) offences against the provisions of the Labour Ordinances and Regulations committed within any part of the Witwatersrand district, (ii) offences summarily triable by a Court of Resident Magistrates committed on the premises on which such labourers are employed.

(m) *Courts of Resident Justices of the Peace.*—A Resident Justice of the Peace has a certain restricted criminal jurisdiction. He may try all offences set out in the third schedule of Ordinance 19 of 1904—*e.g.*, contravention of the Master and Servants' Law, the Squatters' Law, etc. His power to punish is limited to the infliction of a fine not exceeding twenty-five pounds or of imprisonment with or without hard labour to a period not exceeding one month. Besides Resident Justices of the Peace there are ordinary Justices of the Peace, who have no judicial functions.

(n) *Court of the Commissioner of Patents.* — The Commissioner of Patents has power in the first instance to hear and decide on objections taken to an application for the grant of a patent. From his decision there is an appeal to the Supreme Court. He has also power to decide whether a patent shall be granted even where there are no objectors, and from such decision there is right of appeal to the Attorney-General.

Administration.

The Attorney-General's Department.—The Attorney-General is the chief legal adviser to the Crown. He is head of the Law Department, and in him is vested the power to prosecute all criminal cases on behalf of the Crown. A large number of different functions are vested in him—*e.g.*, the reviewing of certain decisions of Chinese Inspectors, and the supervision of lunatics. He has the services of several assistant legal advisers at Pretoria, and of a Crown Prosecutor and an assistant Crown Prosecutor at Johannesburg—all of them advocates of the Supreme Court. The Secretary to the Law Department is the permanent head of this branch of the public service. Mr. Hercules Tennant was holder of this office at the commencement of 1906.

The Master of the Supreme Court.—The Master of the Supreme Court exercises important duties in connection with the probate of wills and the administration of the estates of deceased persons. In him are deposited all the functions of the old Orphan Chamber, and he is entrusted with the supervision and control of tutors and curators. He has also important judicial and administrative duties with regard to insolvent estates, and companies in liquidation; but these functions may now be entrusted by the Governor to a Commission. Among his other duties is the obligation to appoint curators of lunatics' properties. At the time of writing the Master is Mr. J. W. Bell.

The Sheriff.—The Sheriff is appointed by the Governor, and may himself duly appoint deputies who may then exercise any of his powers. The Sheriff has to carry into execution all sentences of death, execute the processes of all Superior Courts, make a proper return of the same, and receive and detain in prison all persons arrested by order of the Superior Courts. He is entitled to receive certain fees. Mr. J. C. Juta is the Sheriff.

The Registrar of Deeds.—The Registrar of Deeds is appointed by the Governor to control the Deeds Office, and has extensive and important duties with regard to the due registration of documents. He must register original grants of land, and all transfers, mortgages, and leases of landed property. In short, he is responsible for the due administration of the law with regard to land transfer and registration. The Registrar of Deeds is Mr. J. Smuts.

[*The photographs of the Hon. Sir Wm. Smith (third Puisne Judge), the Hon. Mr. Justice Mason (fourth Puisne Judge), and the Hon. Mr. Justice Bristowe (fifth Puisne Judge), were not available when this work went to press.*—Ed.]

Ethnological Section.

THE administration of native affairs in the various South African Colonies is one that requires diplomatic skill, tact, firmness, combined with a thorough knowledge of the customs and usages of the various and numerous tribes that inhabit the sub-continent. Extreme diversity of race and physical and other characteristics need apposite study. The vigilance which is exercised over the interests of the aboriginal races by well-meaning but troublesome critics in Europe is a factor which by no means lessens the important duties of those placed in official authority over the native tribes. Thus the Department of Native Affairs of the Transvaal Colony may be described as one of the most important in its administration.

In August, 1900, while hostilities were still in progress, the British authorities decided that it was advisable to have a special department established to deal with native affairs and maintain a general supervision of this large section of the population of the Transvaal. For administrative purposes the Transvaal was partitioned into five principal divisions, each comprising one or more fiscal districts. Every division is, according to this new scheme, under the immediate control of a Native Commissioner, assisted by Sub-Commissioners appointed over sub-districts, of which there are twenty-four in number. One of the most pressing and difficult questions to be first met was the bridging over of the strained relationship existing between the Boer farmers and their native tenants. The natives were imbued largely with the idea that with British supremacy the Boers were to be displaced from the land, which would then be parcelled out to them. Impressions of this kind in the native mind the Commissioners and their staffs have succeeded in dispelling, and these officials have also, in the majority of cases, persuaded natives to re-settle upon farms where they formerly resided.

The "Transvaal Administration Reports" bluebook for 1902 supplies much interesting information regarding the inception of the Native Affairs

THE NATIVE AT HOME.

NATIVE HUTS AND "MEALIE PATCH."

Department and the conditions with which it had to grapple. In his report contained in that volume, the Commissioner for Native Affairs states:—

ZULU WOMAN GRINDING CORN.

"Generally speaking, the status of the natives in the Transvaal Colony is one of a low order compared with other parts of South Africa, though exceptions may be made in favour of a good many in the Rustenburg, Pretoria, and Potchefstroom districts, who have been for years sandwiched between white farmers and have acquired semi-civilised habits. Where the masses are, their housing, mode of

INTERIOR OF NATIVE HUT.

living, and general intelligence are inferior. They have not had many opportunities to improve. Education has remained almost exclusively in the hands of foreign missions belonging to the Berlin and Swiss societies, which have received little encouragement or help, and have made little headway. I am now considering with the Director General the best form of extending education of an elementary and useful nature in all districts where it is possible; and it is proposed to have a school for the education of teachers who shall also be taught and qualified to teach useful trades."

It would appear that, excepting through the medium of the foreign missions alluded to, and the mission centres in the towns of the territory, religion has not penetrated the masses of the natives of the Transvaal. There are in the country only a comparatively few aboriginals who have arisen above a low standard; in the towns, however, and especially in the Witwatersrand area, there are a number of native artisans employed in intelligent work of all descriptions, in addition to the large numbers of labourers imported from other colonies in South Africa or of Transvaal origin. The artisan class is absolved from the ordinary restrictions of the pass regulations, as are also the "Cape boys" (half-breeds). Such cherished institutions as polygamy and the purchase of wives by dowry are tenaciously clung to by the Pagan natives, and it has always been found expedient to refrain from rude interference with these customs. However, Christianity and civilisation are exercising their influences, and objectionable practices are very gradually but surely disappearing. The Native Affairs Department seems to have been impressed from the first with the importance of the question of the supply of labour to the Witwatersrand gold mines, and it at once commenced to formulate plans for the re-adjustment of the methods that had previously been in operation in this regard. In

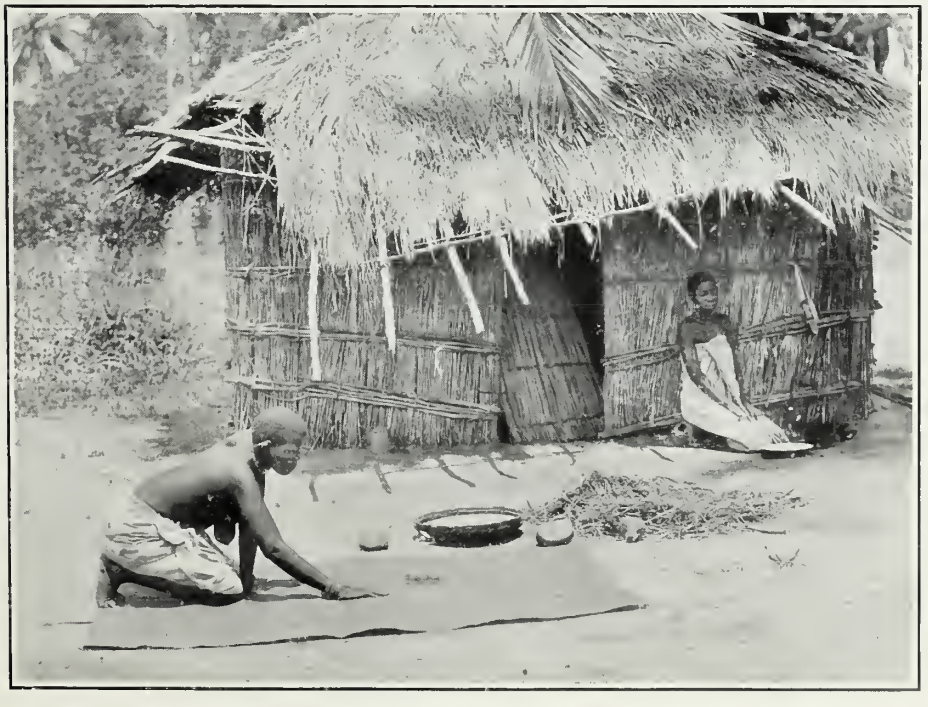
NATIVE SLEDGE
(formed of forked tree branches), used in transport of domestic supplies.

his report for 1902 the Commissioner observes:—"Much has been said and written in the past about the bad condition of natives working at the great mining centres. The conditions formerly were notoriously bad, and such as to deter many who might otherwise have songht labour there. During the short space at our disposal since the declaration of peace much has been done to improve these conditions, and much remains to be done. One of our first works was to appoint a body of competent inspectors whose duties were to be in continual touch with mine natives, to guard their interests, and to promote their betterment. Reforms in the matter of accommodation, diet, and sanitation have been adopted." Sir Godfrey Lagden later pays a tribute to the Executive of the Chamber of Mines and to all those concerned with mine management for the discerning and ready manner in which they responded to the suggestions made by the Department; and he illustrates how, in the average, the native labourer is in much better physical health when he has completed his term of work than when he started.

CONSULTING A WITCH DOCTOR ("TAGATI"),
generally assumed by a man, but sometimes by a female, as here seen.

Under the provisions of Proclamation No. 37 of 1901, pass offices are maintained at convenient centres for the registration of all natives employed within proclaimed labour districts. This is a large and important branch of the Native Affairs Department, which has also instituted a useful Deposit and Remittance Ageney having the co-operation of the Governments of the different British South African Colonies.

Reviewing the history of the Native Affairs Department, it is of passing interest to study the annual reports of the Commissioner for Native Affairs. The first of these was issued in March,



NATIVE WOMAN PREPARING FOOD (NORTHERN TRANSVAAL).

SHANGAAN (EASTERN TRANSVAAL)
matrons carrying children.

1903, covering a period ended 31st December, 1902. In the course of his report for 1903-4 the Commissioner observes that the European and native

MEDICINE MAN.

The "muti," or medicine, is carried in the necklet of goat horns.

races are inter-dependent upon each other—the one for labour and the other for sustenance. He deprecates the fact that the demands of the great industrial centres are so great that many natives who ought to be working on the land are attracted away, with the result that agricultural demands cannot be met. Labour always has been and will always be attracted to the market where the best pay is offered, but experience has shown that it is a mistake to indulge the natives in unreasonably high wages for part of the year, and permit him to pass the remainder of the year in idleness. The result is usually demoralising, and is often accountable for increase in crime. It is the opinion of those who have given intelligent observation to the subject that rates of pay to boys raw from the kraal should be just such as to serve to supply all necessaries of life, and such luxuries as have no harmful effect.

ZULU "KESHLA"
(or elder of a kraal), wearing gum ring worked into hair as type of his status.

(This ring is made of native misseltoe and clay.)

ZULU MARRIED WOMEN.

The married women among the Zulus and Natal natives are distinguished by the method of wearing the hair, which is worked up into a toque with red clay, and is never removed.

On the other hand town natives, who are in regular employment and live in town locations, have to meet comparatively heavy charges for rent and other calls, and necessarily require a higher rate of wage.

The statute laws of the Transvaal affecting natives differ materially from those of the other South African Colonies. In the Cape Colony the common law prevails; in Natal, where the aboriginals are numerically large in comparison to the Europeans, there is a specific code. In the Transvaal there is what may be described as a mixture of the two. Chieftainship still survives in some colonies, while in others it has practically disappeared. In a large territory such as South Africa, containing as it does so many different native races, the methods of administration naturally vary. The obvious aim of the Native Affairs Department of the Transvaal has been to discover what form of administration is best, and every endeavour has been and is being made to bring about desirable changes in a quiet way—violent innovations being avoided. From the inception of its organisation the Native Affairs Department had to face a problem thorny with difficulties, rendered all the harder by the perplexing and unsettling effect of the Anglo-Boer war upon the native mind. Natives were employed very largely in transport and scouting work during hostilities, and the regular troops, fresh from Europe, had but little idea of the relations existing in South Africa between the white and the black races. Consequently the natives were allowed what were in the eyes of the colonists exceptional privileges, and were permitted what appeared to them unprecedented familiarities. On the declaration of peace the natives employed by the military had become comparatively wealthy by the accumulation of liberal wages, and were disinclined to accept work on the farms or on the mines at the rate ruling prior to

hostilities. The consequence was a dearth of native labour. The Government of the South African Republic employed for the district administration of native affairs no fewer than 150 white officials. For the discharge of similar duties, and with the added responsibility of coping with numerous irritating conditions, 25 appointments were made by the British Government. The gentlemen selected for these positions could not possibly have been equal to the task had they not been experienced, thoroughly familiar with racial customs and dialects, and chosen with discrimination. They had the invaluable and indispensable assistance of a small body of trained native police and messengers. The latter are the eyes and ears of the Department, and are in constant inter-communication with the chiefs and the Government. They form an intelligent and trustworthy link between the Government and its aboriginal subjects. Reductions which have been made in the numerical strength of these native auxiliaries have been deprecated by officials who have much evidence of their usefulness. For, the bulk of the natives being illiterate, it is only through verbal intercourse that they can be made acquainted with the laws and orders of the Government. Only by such means also can the authorities keep in touch with the opinions and thought of the native people, preserve efficient control, and ensure the regular and prompt collection of revenue.

The land question is one of the most serious with which the staff of the Department of Native Affairs has had to deal. In many instances the land on which the aboriginal tribes were living when the Boers arrived in the country, or before that time, was allotted to farmers, as it was found suitable for their occupation, and the natives were obliged to either regain possession by purchase or to become farm servitors. There were inevitable inter-tribal disputes, and the Boers seem to have systematically and consistently broken up land occupied by natives after attempts at rebellion, of which there were several instances during the rule of the Republic. Certain treaties were also arranged by which chiefs ceded territory to the South African Republic, and other chiefs were granted locations if the number of their people warranted it.

In the early days of its existence the Boer Government refused natives the right to hold land in their own name, and the natives resorted to the expedient of registering in the names of the missionaries what farms they had acquired. During the first British occupation natives were given the right to purchase land to be registered in the name of the Secretary for Native Affairs, and this method of registration was followed by the Republican Government up to the outbreak of the last war with the British. The present

ZULU KRAAL, WITH TYPES OF MARRIED WOMEN AND SINGLE GIRLS.

Those girls wearing ornaments on the head are betrothed.

THE MORNING TOILET.

(The toque is carefully dressed daily.)

Department of Native Affairs had returns compiled in 1904 which show that the land principally occupied by natives is equivalent to about one-fourteenth of the whole area of the Transvaal, about one-third of the entire native population being located in the northern or Zoutpansberg district. Approximately the apportionment is as follows:—

(a) Government locations: area, 2,120 square miles: 1-52nd part of the Transvaal.
(b) Farms owned by natives: area, 853 square miles: 1-130th part of the Transvaal.
(c) Undefined locations on private farms: area, 3,863 square miles: 1-29th part of the Transvaal.
(d) Undefined locations on Government farms: area, 1,008 square miles: 1-110th part of the Transvaal.

A NATIVE CENTENARIAN WHO SAW THE FIRST ADVENT OF THE WHITE MAN.

So far as could be ascertained, the distribution of the native population in proportion to the whole of the Transvaal was at that time:—

On private farms owned by Europeans or companies, one-fifth.
In established Government locations, one-fifth.
On Crown lands, one-eighth.
On land owned by natives, one-twelfth.
In the remainder of the Transvaal, two-fifths.

The above figures show that the land now exclusively reserved for native occupation by the Government, and the farms actually owned by the natives themselves, total not more than 1-38th part of the whole Colony. The remainder is held either by Europeans individually or companies, or by the Government. Therefore the natives are practically secured in their occupation of only a very limited extent of land, the great majority of them being merely tenants at will. The conditions under which natives are allowed to live upon private farms or Crown lands have been, as far as possible, assimilated. On Crown lands they are in the position of tenants of the Lands Department, subject to three months' notice on either side.

"BOYS" LEAVING THE RAND MINES FOR HOME.

Each male adult pays an annual rent of £1, and agrees to give if required six months' labour every year at the current local rate of wages. This contract confers the right (a) to cultivate such land as may be allotted to them, (b) to graze such stock as may be their *bonâ-fide* property, and (c) to use such wood and water as may be needed for ordinary domestic requirements. With regard to private farms, the system has been adopted of encouraging a definite agreement in writing between the landowner and

NATIVE HUT-BUILDING.

his native labourers—such document being authenticated and recorded by the Native Commissioner of the division. This agreement sets forth the conditions of tenancy as regards residence, cultivation, grazing and fuel, on much the same lines as prevail in connection with tenants on Crown lands, though the rate of wages and the amount of labour required are specially determined in individual cases. It was considered advisable to institute this system because of the friction that had arisen, and its operation has so far proved satisfactory.

The laws of the various South African Colonies differ in material respects on the subject of native squatters' obligations and privileges. None of them are clear in construction, and few, if any, are at the present time operative. Indeed, all indications lead to the conclusion that no serious effort has ever been made to carry them out. There have certainly been agitations in each of the Colonies directed towards the enforcement of these laws, but attempts to give practical effect to them have invariably brought the Government in conflict with landowners, or farmers, or with vested interests. In the Transvaal this question of squatting has engaged attention for many years, as indeed it has in the older Colonies. There were frequent discussions concerning it in the Volksraad of the Transvaal Republic, and several resolutions were passed and a Commission subsequently appointed to deal with the matter; but there appears to have been no intention of putting the Squatters' Law into operation elsewhere than upon Government lands, and it apparently did not seem practicable to deal with squatting on private ground. The Government and its servants had power to enforce it summarily and with thoroughness, but, even though actuated by the desire to distribute labour so as to best benefit agriculture, they could not overcome the obstacles to such drastic legislation. The opposition came from many quarters, and foreshadowed far-reaching consequences. The British authorities also recognise that the subject is one which must be carefully and patiently handled.

The returns based upon the census of 1904 showed that the native population was as follows:—

Resident in the Transvaal	811,753
Aliens temporarily employed ditto	125,293
Aggregate ..	937,046

Of this total, some 112,000 natives were resident on established locations set apart for them, and there were 41,000 living on farms purchased and owned by natives. There were approximately 135,000 residing on private farms, and on Government ground or Crown lands some 82,000. The balance were scattered on various farms, and employed on mines and in the towns.

The question of the supply of native unskilled labour to the mines—especially those in the Witwatersrand area—has been a very perplexing one.

INTERIOR OF A NATIVE COMPOUND (ROBINSON G.M. Co.).

From the account of those "boys" who had been employed by the military at an enhanced rate of pay there is little doubt that the natives

A GROUP OF "BOYS" EMPLOYED ON THE GELDENHUIS DEEP MINE, WITWATERSRAND.

generally throughout South Africa conceived an extravagant impression of the value of their services, in whatever capacity. On the re-settlement of the country and the simultaneous endeavour to re-start the gold mining industry of the Transvaal, it was found that adequate labour was extremely difficult to obtain. Mining properties were at a standstill, and in numerous instances headgear and other plant had been partially or wholly ruined during the period of hostilities and consequent stagnation in the industry. Deplorable though the local circumstances might be, the interests of shareholders had to be safeguarded. Companies found that under existing conditions it would be ruinous to engage native labour at the rate which had been paid by the military, or even at their own pre-war rate. As a matter of fact there were many instances in which the pre-war standard could not, for a time, be maintained. However, notwithstanding the numerous impediments to rapid progress which were part of the aftermath of the war, the development of the least-damaged mines was proceeded with as soon as working staffs had been gathered together. It is pertinent at this stage to indicate comparative rates of wages which have prevailed in recent years on the gold and coal mines of the Transvaal. They are as follows:—

	Gold. s.	d.	Coal. s.	d.
Monthly average rate for 1898 ..	47	1	46	11
Monthly average rate for statistical year 1901-1902..	36	8	34	2
Monthly average rate for statistical year 1902-1903..	38	6	37	2
Monthly average rate for statistical year 1903-1904..	48	10	42	7

NATIVES WORKING IN AN OPEN CUTTING (CROWN REEF G.M. Co.).
This is the only mine on the Main Reef where work is done from an open cutting.

In addition to the wages as above given, the employer provided food, accommodation, medical attendance, hospital treatment, etc., free of charge. There exists on the goldfields an association named the Witwatersrand Native Labour Association, the object of which is to control and regulate the employment and distribution of native labourers. The majority of the mines are affiliated with this body, and have entered into an engagement to obtain labour only through its medium. Previous to the existence of the Association the supply of native labour was obtained through the agency of individual and competing recruiters, but many of these labour agents were unscrupulous in their methods, and the dissatisfaction with which they came to be regarded by employer and employee resulted in the formation of this responsible organisation. The Association has a large number of recruiting agents. Some of these are paid fixed salaries, and the others—the great majority—are paid only a commission proportionate to the number of labourers secured by them. In addition to this staff there are several permanent officials retained, and to meet the expenditure thus entailed a charge is made upon every affiliated mine for each labourer supplied. The rules of the Association

TYPE OF BASUTO GIRL.

TYPICAL NATIVE LABOURERS.

have been relaxed so far as to permit of individual mines sending out their own recruiting agents, but there is a stipulation that all labourers so recruited shall pass through the books of the Association, and the usual charge be paid for them. This charge is £2 for every labourer who contracts an engagement for a period of six months, and £1 for every labourer contracted for a period of three months. The 1904 rates of pay under the Association regulations were, nominally, for surface boys £2 10s. per month, and for underground boys £3. The term "nominally" is here used because in practice the engagements are not at so much per month, but at 1s. 8d. and 2s. per day respectively, and there are complications consequent upon the difference between the calendar month and the native "moon." There are native compounds on every mine property, and the "boys'" quarters are commodious, with complete sanitary arrangements, fresh water—often hot and cold—being laid on in unlimited quantity. The staple food supplied is mealie-pap, but this is judiciously varied with meat and vegetables. The number of boys employed on mines in the Transvaal from October, 1904, to September, 1905, inclusive, were as under—many, of course, being drawn from outside the Transvaal Colony :—

	Gold mines.	All mines.
1904.		
October ..	78,491	91,280
November ..	81,673	94,388
December ..	83,639	97,258
1905.		
January ..	89,895	104,902
February ..	97,882	114,318
March	105,184	121,242
April	107,756	123,299
May	106,864	121,642
June	104,902	120,131
July	103,623	117,788
August	100,081	111,494
September ..	97,721	113,251

One problem which the Native Labour Association has had to face, and is still dealing with, is that of the contract time. The native has always given special consideration, when engaging for a term of labour, in whatever capacity, to the call of his home ties —if a married man with wives, his ploughing and sowing; if an unmarried man, the pleasures of an idle spell at the kraals among his kinsmen and friends—at least once a year. Therefore he has strong objection to a system of eight months' continuous labour. Boys are generally agreeable to six months contracts, and, if satisfied with the treatment meted out to them at their work, and if not required at the kraal, often renew their term of service.

SHANGAAN MINE BOYS, ZOUTPANSBERG.

Shortly after the 1899-1902 war a fierce controversy was waged on the question of supply of unskilled labour to the mines. Reports and statistical information on the subject showed that the natives of South Africa could not, or would not, meet the demands of the mine-owners in a sufficiency of labour. The question then arose as to how the deficiency was to be met. The mining houses held consultations, and the result was an agitation in favour of the importation of Chinese coolies, which was first voiced by Sir George Farrar on the East Rand. Many thousands of Chinese were shipped to the country, and are now employed on the various mines.

Under an Ordinance No. 20 of 1902 an annual tax of £2 is imposed upon every adult male, and, in the case of married men, upon every wife. About £380,000 a year is paid into the Treasury from this source.

The total revenue collected during the year 1st July, 1904, to 30th June, 1905, amounted to £652,521, and the expenditure on account of all services for the same period was £88,342. The Colony thus derived a nett revenue from this Department of £564,179 during the financial year.

Education in the Transvaal.

THE educational system under the British administration may claim to have been started in 1901, by the establishment of primary and secondary schools in the larger towns in the Transvaal, and by the inaugurating of schools in the concentration camps, which were attended by over 17,000 children. On the outbreak of the war, State schools were formally declared closed; independent schools closed by force of circumstances; and such educational work as continued to exist was but spasmodic and ineffective. The highest number receiving instruction in Government schools throughout the Transvaal before the declaration of war had been something over 13,000. To this number may be added the children attending the schools of the Witwatersrand Council of Education, to the number of, roughly, 1,200, which are now included in the total of the Government Schools. A Director of Education was appointed, and the work of the department over which he presided commenced in January, 1901.

JOHANNESBURG COLLEGE, BARNATO PARK.

Primary Education.

The period of "repatriation" was roughly one year. The problem before the Department was to follow up the children as they scattered to their homes, and to make the break in their education as small as possible. This was solved by organising a series of new "camp schools"—genuine camps, where the teachers lived in tents and taught in tents, pitched at any spot in farming districts within easiest reach of the largest number of available scholars, and moving from place to place according to the needs of the shifting and unsettled population. These farm schools fulfilled their mission bravely, in spite of the enormous difficulties of transport and the lack of furniture and other conveniences for proper teaching. The number of these schools in September, 1905 (with an enrolment of 10,092), was 281. These are now housed in more or less permanent buildings. Besides the farm schools, a number of free schools were established at all available centres throughout the country. The number of town and village schools at the same date was 99, with an enrolment of 17,965. Thus the number of white children attending Government Free Schools at the end of the third quarter, 1905, was 28,057. The subjects taught are:—

Reading, English and Dutch
Grammar, English and Dutch
Composition, English and Dutch
Writing
Arithmetic
History
Geography
Kindergarten
Needlework
Singing
Drawing
Physical training
Manual training
Object lessons and nature study.

Higher Subjects:

Mathematics	French
Science	German.

The salaries of principals range from £150, in the case of small farm schools, to £500 at the large Johannesburg schools. The supply of male teachers is limited.

Secondary Education.

The first work inaugurated in the Transvaal was the re-organisation of the Pretoria High School for Boys, which had existed before the war under another name. It re-opened early in 1901 with one master and five boys. Fast on its heels came the Johannesburg High School (now known as the Johannesburg College), which opened with six masters and seven boys, the superfluous staff being soon drafted to other centres. The Jeppestown Grammar School, originally started by the Council of Education, and by them handed over to a Committee of parents previous to the war, passed under the control of the Government and was re-opened as a High School for Boys and Girls. The need of efficient high school education for girls, partially met by private enterprise, was recognised by the Government, which re-opened the Cleveland High School in Johannesburg (previously a private school), and the Girls' High School in Pretoria, which had done good work before the war. Potchefstroom College for Boys and

its Secondary School for Girls have been recently brought into existence to meet the growing needs of the Western Transvaal. Whilst limiting its efforts to provide the highest form of secondary education to these important centres, the Government recognised the claim of the country towns to the provision of a form of education which would enable the children to fill with credit positions in commercial and industrial concerns, and established fee-paying schools at Germiston, Krugersdorp, Klerksdorp, Heidelberg, Middelburg, Pietersburg, Rustenburg, Ermelo, Standerton, Volksrust, Zeerust, and Wakkerstroom. All these had been carrying on their work before the conclusion of peace. Of these schools, Germiston and Klerksdorp have since been closed; Krugersdorp, Heidelberg, Middelburg, Pietersburg, Volksrust, and Zeerust are controlled financially under departmental supervision by local Committees (of which two-fifths may be nominated members, and the remainder elected by persons connected with the school); while Rustenburg, Ermelo, Standerton, and Wakkerstroom have been incorporated with the town schools as fee-paying departments. By the latest returns the number of the scholars in the high schools is 872, and in the separate fee-paying schools 646. Up to the present the curriculum of the high and fee-paying schools has been determined by the same regulations. The scholars work with a view of passing the Transvaal Lower Certificate Examination in Lower V. Form, and the Transvaal Leaving Certificate or the Cape Matriculation Examination in VI. Form. The subjects taught are:—

English
Mathematics: Arithmetic, Algebra, Geometry
Physical Science
History and Geography
Drawing
Domestic Economy
Modern Languages: Dutch, French, or German
Latin
Greek
Botany
Manual Training
Music.

The salaries of principals of high schools are as follows:—Men, £600 (rising by annual increments of £25 to £800); women, £400 (rising by annual increments of £20 to £600); and of assistants: men, £300 to £500; women, £210 to £350.

BOYS' HIGH SCHOOL, PRETORIA.

Technical Education.

The Council of Education, before the war, had given a good deal of consideration to the subject of technical study, and had collected a large sum of money towards a Technical Institute or school. It was with the gentlemen composing this body that the Government took counsel before fixing on any definite scheme, and a conference was arranged at which representatives of the Kimberley School of Mines and of the South African College were present. A scheme was adopted—the delegates from the Cape Colony coming into line with the representatives of the Transvaal—by which the Transvaal Technical Institute took shape and form, and the School of Mines was removed

GIRLS' HIGH SCHOOL, PRETORIA.

from Kimberley to Johannesburg. The Government purchased a place of residence for the students, and granted a site for the Institute, which was

TRANSVAAL TECHNICAL INSTITUTE, PLEIN-STREET, JOHANNESBURG.

placed in the hands of a Council who are responsible for the management. The Institute commenced work early in 1904. Forty-five students of mining engineering enrolled during the first year, and after evening classes in technical subjects were inaugurated the numbers increased very rapidly. Over 500 persons have taken advantage of the opportunities afforded by this very welcome innovation. The Normal Schools, the Agricultural Schools, the Bacteriological Research Laboratories, which it is hoped greatly to extend, and the evening schools and classes, all come within the scope of this Council. The chief difficulty has been the question of funds. The Government has granted a site and a sum for building, also an amount in aid of current expenses; while the Witwatersrand Council of Education undertakes to supply an annual sum for a specified term of years. The course of instruction at the Institute embraces mining and engineering in all its branches. A general course, including mathematics, chemistry, geology, and other allied subjects, will occupy three years, at the end of which time students will be able to take the specialised course of one year in any of the following branches :—

Mining
Mechanical engineering
Electrical engineering
Civil engineering.

Evening schools and classes give instruction in :

Elementary reading, writing, and arithmetic
Advanced English
Dutch
Advanced arithmetic
Languages, mathematics, for Matriculation examinations
Shorthand
Bookkeeping
Needlework
Chemistry
Carpentry, building and machine construction, etc.

Law classes were formed during 1905, the students of which were very successful at the Transvaal Law Certificate Examination in December, 1905. The Technical Institute conducts evening classes in Pretoria, Krugersdorp, Potchefstroom, and Roodepoort.

The Education Department gives a grant in aid of these classes.

HIGH SCHOOL (SECONDARY EDUCATION COLLEGE), POTCHEFSTROOM.

Native Education.

In 1903 an Organising Superintendent of Native Education was appointed, no attempt having up to that time been made to bring this important matter under Government control. There are six Government schools on the Rand, with an average attendance of 800, these being almost entirely Cape coloured or Asiatic children, but the education of the native proper is entirely in the hands of missionary bodies—Anglican, Roman Catholic,

Presbyterian, Dutch Reformed, Wesleyan, Congregational, Baptist, and missions from Berlin, Hanover, and Switzerland. For the present the Government acquiesces in this state of things (which obviously cannot be permanent), and attempts only to subsidise, inspect, and organise more effectually this heterogeneous mass of amateur endeavour. Some 200 of these schools have been found to exist, with an approximate attendance of 12,000. The greater number registered under the Government, and grants amounting to over £4,000 were distributed among them in proportion to the numbers attending, for equipment expenses. About 800 teachers, 41 of whom are white, have been at work.

Public Education.

Ordinance Public Education.—The first Education Ordinance was passed on February 25th, 1903. The object of this Ordinance is to make public the general policy of the Government in regard to education, and to confirm the fundamental principles of a system which already included a larger number of scholars than that of the late Government at its highest stage of development. (1) It provides for free elementary education wherever there is an average daily attendance of not less than thirty scholars. (2) It recognises the responsibility of the Government with regard to the whole system of education from the elementary school to the University, and, besides empowering the Government to establish, maintain, and control institutions providing every grade of education, it further recognises the duty of Government to ensure the efficiency of educational institutions established and maintained by other agencies. For this purpose the Ordinance bestows on Government certain powers with regard to private schools. By means of compulsory sanitary inspection and the right to insist that all teachers in private schools shall not be less highly qualified than those in Government schools, Government should have sufficient control over private venture in the sphere of education. (3) It meets the "religious difficulty" by allowing the exemption of children from any religious instruction, as well as by providing opportunities for denominational instruction given by ministers of religion in school hours in addition to undenominational religious instruction given by the teachers. (4) It provides for instruction in Dutch to the extent of five hours a week for the children of those parents who desire it. (5) It provides for the appointment of local Committees whose functions shall be solely consultative and advisory. (6) It makes provision for the education of native and coloured children, due emphasis being laid on the necessity that manual training should form part of this education.

HIGH SCHOOL FOR BOYS AND GIRLS AT JEPPESTOWN, JOHANNESBURG.

NEW GOVERNMENT SCHOOL AT KRUGERSDORP.

Teachers.—The Ordinance provides that all teachers should hold certificates, those in Government schools from 1st January, 1904, and those in private schools from 1st February, 1906. To meet this the Normal Col-

lege was started in Pretoria. Eligible candidates are admitted to this institution once a year, are granted bursaries entitling them to free training, board, lodging, and laundry, and are prepared for the third and second-class certificates of the Department. At first it was found necessary to import teachers from England, Scotland, Wales, Canada, Australia, and New Zealand, to the number of 400, to assist in the camp schools. The majority of these have remained in the service. Latterly the importation has been very limited, and the Department hopes to rely mainly on the local supply. Three classes of certificates are granted as qualification. First-class certificates are not yet held by any member of the Department. It will be granted to headmasters and assistant masters of secondary schools on the completion of six years' successful service, and the production of an original thesis on some professional subject after one year's travel—a report of such travel to accompany the thesis. These studies must be approved by the Director. Second-class certificates are granted to teachers who hold a B.A. degree in some recognised university, or who have satisfactorily passed the specified course of training at the Normal School, or an equivalent departmental examination; or who have served successfully for four years in the Department; or who possess such qualifications as shall be considered equivalent. Third-class certificates are now granted on examination after one year's professional training at the Normal College, or to teachers who can show equivalent qualifications.

GOVERNMENT SCHOOL AT TROYVILLE, JOHANNESBURG.

Bursaries.—Besides the Normal College Bursaries, the Department encourages promising pupils from the free elementary schools to proceed to the high schools by granting boarding and day bursaries at an annual examination. At the examination in December, 1905, 272 candidates entered (89 boys and 183 girls) for the following bursaries :—

Full boarding and day inclusive	60
Half boarding and day ..	5
Half boarding only	1
Day only	97

making a total of 163 pupils receiving bursaries.

The attendance of scholars at Bible or religious classes is not compulsory. A special Commission was appointed to inquire into the whole question of religious instruction in Government schools. A majority report and a minority report were presented, the majority report strongly in favour of abolishing the right of entry in view of the mass of evidence against its useful and harmonious working. The minority report had only two signatories. The present High Commissioner has postponed giving effect to the report until a representative Assembly shall be returned.

Orphanages.—The Government has opened two orphanages, at Irene (near Pretoria) and Pietersburg respectively, and has subsidised an Industrial School at Potchefstroom, where orphans, in addition to a sound education,

THE SECONDARY SCHOOL, MIDDELBURG, IN 1905.

are instructed in useful crafts. No reformatories, or special schools for the afflicted, have, up to the time of writing, been founded, owing to the lack of funds. The Government makes use of the institutions, such as the Worcester Institutes for Deaf, Dumb, and Blind, which are already in existence in Cape Colony.

Education Department.

The two new Colonies were at first united under one Director of Education. Later the Colonies had separate Departments. The Government sought and obtained the help and advice of many able men interested in education before the war, to whom the special needs and difficulties of the country were well known. One of the worst difficulties has undoubtedly been the question of transport and supply over such vast tracts of arid veld, scattered with burnt villages and ruined homesteads; another has been the want of suitable buildings for schools and accommodation for teachers. Many schools have been at one time or another of their history in hired and temporary premises—notably the Johannesburg College, which occupies Barnato Park, the residence built by the late Barney Barnato, leased to the Government at a heavy rental. Other schools have had to be conducted in churches, halls, stores, and other uncomfortable quarters; buildings have had to be purchased and improved and new ones erected. All this time the work of instruction was going on, increasing and progressing. Many admirable premises have been erected, the Government appearing to have adopted for their large town schools the pretty Dutch gabled style in green and white as the model. The new Free Schools at Troyeville, Jeppestown, and Mayfair are very good specimens of this style. These schools were built to accommodate 600 children each. The temporary premises of the first three years after the war are rapidly becoming things of the past. Several private schools placed themselves at the disposal of the Government, and were taken over at a valuation and incorporated with their staffs in the Department. Premises have been acquired, though with difficulty, for the accommodation of teachers.

GIRLS ATTENDING THE SECONDARY SCHOOL, MIDDELBURG, IN 1905.

BOYS ATTENDING THE SECONDARY SCHOOL, MIDDELBURG, IN 1905.

The head office of the Education Department is at Pretoria. The official head of the Department is the Director of Education, assisted by the following officers:—

- Departmental Secretary
- Registrar
- Examiner
- Accountant
- Superintendent of Native Education
- Ten District Inspectors.

The Department of Education is a sub-department of the Colonial Secretary's office.

Conclusion.

The prospects of education in the Transvaal have never been more encouraging. There is a constant demand for schools from new districts and for new schools in districts already supplied, and for the enlargement of existing premises. The Education and the Public Works Departments have had trouble in meeting this demand at a period when the scarcity of transport, and of building materials, of suitable teachers and officials, hampered all departmental work; but these difficulties are disappearing one by one, and in the near future it is to be expected that there will be but few districts of the Transvaal Colony in which Government Free Schools have not been established. A constant supply of new teachers is forthcoming yearly from the Normal Schools, and the funds available for educational purposes will, neeessarily, increase in proportion to the revenue and prosperity of the country.

Besides the efforts of the Government to spread the opportunities for a good general education throughout the country, there is a commendable work earried on by many private schools in Johannesburg and other towns. Referenee is made to these elsewhere in this work. Attention may also be specially direeted to the work of the Christian National schools in the country districts, which are earrying on sueeessful teaching in areas often untouehed by the schools of the Government system.

NORMAL COLLEGE, PRETORIA.

Meteorology.

THE Transvaal Colony lies to the north of the Orange River Colony, having the Vaal River for its southern boundary; to the east of Bechuanaland; south of Rhodesia, having the Limpopo River for its northern boundary; and west of Swaziland and the Portuguese territory, from which latter country it is separated by the Lebombo range of hills. It will thus be seen that it lies well inland, and away from all marine influences, the nearest point to the sea being about 40 miles distant therefrom. It is this almost entire absence of marine influence that imparts to the Colony its wonderfully dry climate, and that is responsible for its comparative exemption from damp fogs and mists. There are certainly a few places along its eastern boundary, where it most nearly approaehes the sea, where mists are of common occurrence, but as a whole the eountry is singularly free from them. It is perhaps not saying too mueh to affirm that for purity and general healthfulness the climate of the Transvaal—as, indeed, of the greater part of South Afriea—is unrivalled. It may well be ealled "sunny South Africa," for it is indeed a land of almost eternal sunshine. And yet most travellers and dwellers in the country can give testimony to the fact that, although on a bright day the direct rays of the sun are naturally very powerful, yet even on the hottest day the temperature in the shade is quite pleasant. It is a popular error to think that the nearer one approaehes the Equator in Africa the higher the temperature must naturally beeome. Almost the reverse is the case, as the great elevation of the land away from the sea eoast moderates the heat so that large portions of tropical and subtropical Afriea, including the greater part of the Transvaal, enjoy an almost ideally temperate climate. The absenee of damp in the elimate of the Transvaal is so eomplete that when abrupt variations of temperature oceur they are scarcely felt. There are praetically no days in the course of a normal year upon whieh one is unable to move outside and earry on his ordinary duties on account of bad weather. One of the distinct features of this Colony, as also of Natal, is the oecurrenee of sudden and violent thunderstorms. These are

generally experieneed at the commencement and elose of the "rainy" seasons—that is, during October and November, and again in Mareh. They are usually preceded by a tenseness and closeness of the atmosphere, during whieh all nature appears to await in silence the oneoming storm. Sueh storms form up with amazing rapidity, and eome, literally, "on the wings of the wind." At one moment the sky is eloudless, the sun shining brightly, when snddenly the wind drops, the sky is darkened, a weird silenee falls on everything, a stifling eloseness of the atmosphere beeomes oppressively felt, and in a quarter of an hour's time the storm bursts, and rages with inconeeivable fury, torrents of rain falling. The thunder peals ineessantly, and dnring a typical storm the pale vivid lightning flashes without intermission. Such storms, however, usually subside as qnickly as they come, and passing away leave the sky eloudless and the air delightfully eool, though every tiny rill and spruit has beeome a miniature torrent, and the large streams are transformed into swollen and impassable floods. Dry storms are not of frequent occurrence, fortunately. In eertain respects the winter (or dry season), which lasts from May to the middle of September, may be considered the most pleasant time of the year, the sun's rays being always comfortably warm during the day, the air dry, clear, and braeing, and the nights eool, or even eold. The almost total absence of mists and vapour imparts a elearness and elastieity to the atmosphere whieh enables the sun's rays to reach the earth more easily, and whieh nnquestionably aeconnts for the deep elear blue of the African sky. At all the higher elevations a Transvaal winter's day is one prolonged spell of elear, bright sunshine, whieh is extremely exhilarating. The air is dry and soft, but salubrious and braeing, and the atmosphere rich in oxygen. During a period of abont half an hour before and an hour after sunset a peenliar chilliness ereeps over the land, but owing to the extreme dryness of the atmosphere it is seldom prodnctive of any ill effects.

OBSERVATORY AT VEREENIGING.
(Observer, Mr. T. N. LESLIE, F.R.Met.S., F.G.S., etc.)

GOVERNMENT OBSERVATORY.
Headquarters of the Transvaal Meteorological Department, near Johannesburg.

Physical Configuration.

Speaking generally, the Transvaal may be said to consist, topographically, of a series of plateaux ranging from an elevation of abont 454 ft. at Komati Poort to nearly 8,000 ft. on the Drakensberg. About one-fifth of the land area of the country lies between 600 and 1,500 ft., this portion of the country being generally known as Low or Bush Veld. Two-fifths has an elevation of between 1,500 and 4,000 ft., and is known as the Middle Veld, and the remaining two-fifths comprises the High Veld, and has an altitnde of above 4,000 ft.

The Low Veld is a tropical and subtropical zone, presenting generally the

appearance of a park-like, closely-wooded country, covered with low bush and insignificant trees, with here and there a considerable extent of dense thickets. The grass is usually rank and coarse. The Middle Veld, embracing the middle plateaux of the Transvaal, lies generally to the north of the High Veld and to the west of the Drakensberg Range. It is fairly well wooded in all the numerous kloofs. The High Veld consists of a gradually sloping plateau formed by the upper slopes of a ridge which crosses the Colony from east to west, and extends into the Orange River Colony. The apex of this ridge has an average altitude of 6,000 ft., and for this reason is the healthiest of the three zones. Its main features are those of a treeless, unbroken, but rolling plain, though that portion of it which includes the buttresses and upper slopes of the Drakensberg presents a far more broken and rugged aspect.

Temperature.

The Transvaal experiences great extremes of temperature, particularly in the Low Veld, where the heat is excessive during the day and the nights very cold, though without frost. These extremes of temperature cannot possibly be accounted for by the small range of latitude, which is only 5° 45′, but are doubtless due to the range of altitude, which is about 5,000 ft. The mean annual temperature varies from about 57° Fahr. to about 70° Fahr. The monthly mean ranges from 50° Fahr. to 70° Fahr. The mean summer temperature varies at different stations, ranging from 69·5° Fahr. to 72·5° Fahr., and that of winter from 53·6° Fahr. to 64° Fahr.

The following figures will serve to show the climatic differences in respect of the three principal life zones of the Transvaal:—

	Representative Station.	1904-5.				
		Absolute max.	Absolute min.	Average of Max.	Average of Min.	Average of Year.
		°	°	°	°	°
Low Veld 400 to 1,500 ft.	Komati Poort 455 ft.	108	33	89·0	60·8	74·9
Middle Veld, 1,500 to 4,000 ft.	Barberton 2,860 ft.	96	37	78·4	56·6	67·5
	Zeerust 3,850 ft.	104	22	81·0	48·5	64·8
High Veld, 4,000 to 7,000 ft.	Lichtenburg, 4,300 ft.	92	23	74·7	47·1	60·9
	Belfast 6,300 ft.	84	18	69·0	42·2	55·6

The writer is indebted for the foregoing statistics, and for the greater part of the following information, to the courtesy of Mr. R. T. A. Innes (Director, Meteorological Department, Transvaal Observatory, Johannesburg).]

Barometer.

The barometrical maximum yearly range is about half an inch, the yearly range being:—Johannesburg, 24·3 to 24·8 inches; Komati Poort, 29·3 to 29·8 inches. The yearly mean range is ·16 inch. Taking each monthly mean, we find the atmospheric pressure to be of remarkable uniformity, ranging between 24·65 inches in Johannesburg, highest monthly mean in June, to 24·49 inches, lowest monthly mean in January.

Sunshine and Cloud.

Few countries in the world have such a sunny, cloudless climate as the Transvaal. The inhabitants enjoy in this country 724 hours more sunshine per annum than does Madrid—the sunniest city in Europe. On a range of from 0 to 10 of cloudiness the Transvaal average is 3·0, as compared with 6·6 in London.

Rainfall.

The average rainfall in the Transvaal is considerable. During 1903-4 the number of rainy days varied from 56 at Bank to 117 at Sabi, the mean for some years ranging from 49 at Ermelo to 120 at Pilgrim's Rest. The mean rainfall for 24 stations situated in various parts of the Colony was 32·16 inches during 1903-4. The minimum was 23·37 inches at Vereeniging, and the maximum 53·61 inches at Sabi. The mean for 14 years at Pretoria was 26·31 inches. It is a remarkable fact that the evaporation in the Transvaal is three times that of the rainfall, which speaks volumes for the actual dryness of the country, notwithstanding the apparently large quantity of rain which falls during the year.

OBSERVATORY AT ZEERUST. (Mr. H. DIETRICH, Observer.)

Snow and Hail Storms.

Snow falls occasionally on the High Veld, usually in the months of July and August. In 1904 a particularly heavy fall was experienced in the middle of September. During the summer very violent hailstorms frequently occur, which cause enormous destruction to

SNOW AT BELFAST, TRANSVAAL, September 10th, 1904.

frnit, tobacco, and other erops. These storms are less harmful if they occur early in the season, but during the month of February sueh falls of hail do irreparable damage.

Wind and Dust Storms.

Speaking generally, the prevailing wind in the Transvaal, year in and year out, blows from the N.N.West. The S.East wind usually brings up rain, but thunderstorms eome up on a N.West wind. During the winter, heavy dust storms not infrequently occnr in many parts of the country, the peculiarly friable nature of the surfaee soil rendering these inevitable when a high wind blows. Whirlwinds are sometimes experienced, which sweep up vast masses of dust, and drive aeross country at a terrific paee, often leaving wreek and ruin in their traek. Such disturbances are usually styled "dust devils"—a name made familiar by the immortal Kipling. An accompanying illnstration shows one such "dust devil" which swept across the suburbs of Johannesburg on October 21st, 1905, and did considerable damage.

The Seasons.

The seasons in the Transvaal are easily divisible into "wet" and "dry." The first light rain sometimes fall at the end of August, more often in the middle of September, but the actnal rainy season may be considered to commenee in October, and to end in March, the remaining months of the year comprising the dry season.

Moisture, Mists, and Fog.

Mists and heavy fogs are almost unknown throughout most parts of the country, but in the north-eastern section, which is nearest to the sea, there is a very clearly defined mist belt. The greatest rainfall occurs on the upper eastern slopes of the Drakensberg, whose lofty peaks catch the moisture-laden clouds from the Indian Ocean and thus cause the great precipitation. Here the climate is more or less moist throughout the year, and the surrounding country is often enveloped in dense mist for several days. The Spelonken district, those of Pilgrim's Rest and Sabi, particularly at

LIGHTNING AT VEREENIGING, Nov. 22nd, 1904.

A "DUST DEVIL," Bellevue East and Observatory Valley, Johannesburg, Oct. 21st, 1905.

Belvidere Bush, and also the Barberton mountains, are the places falling within this mist belt. The belt, however, is not very wide, extending but a few miles on either side of the mountain range.

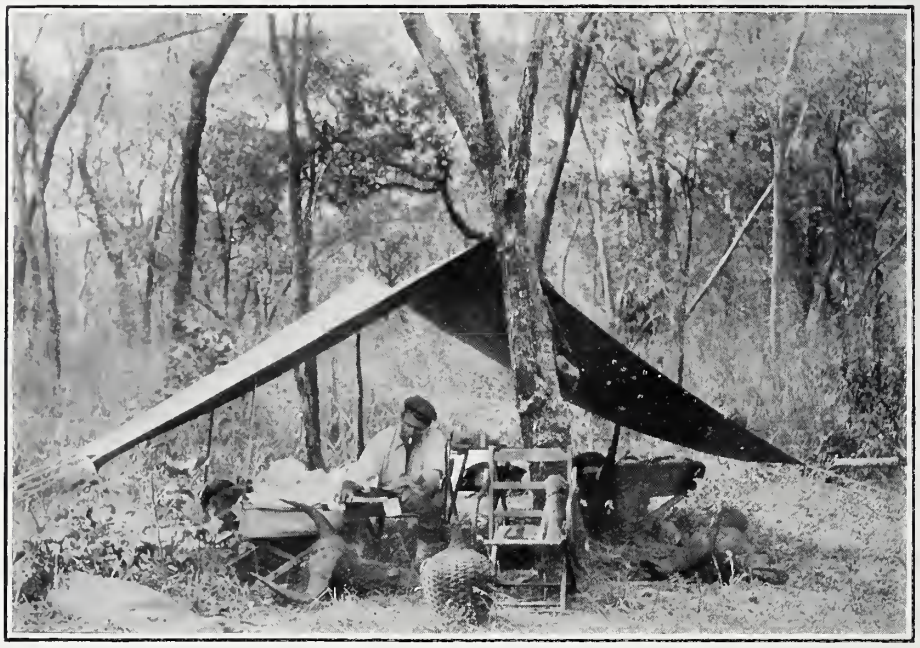
The following meteorological table has been supplied for the purposes of this article by the Transvaal Meteorologieal Department:—

Place.	Elevation.	1904-5.				
		Mean max.	Mean min.	Rel. humidity	Rainfall.	
	ft.	°	°	% 9 a.m.	inches.	days.
Pretoria ..	4,380	77·9	48·6	66	24·75	78
Johannesburg	5,970	75·2	47·8	67	23·60	87
Barberton ..	2,860	78·4	56·6	70	22·14	72
Pietersburg	4,100	77·9	50·1	70	13·69	50
Zeerust ..	3,850	81·0	48·5	66	15·09	58
Christiana ..	4,000	78·0	49·0	63	19·16	68
Standerton ..	5,050	74·0	42·6	62	29·85	85

Sport in the Transvaal.

IT is exceedingly difficult at the present day to form the faintest conception of the wealth of magnificent animal life which wandered over the rolling plains and through the wooded tracts of the Transvaal at the commencement of the last century. The whole country then teemed with an astonishing variety of game, amongst which new forms constantly met the eye. Up to about the year 1860 the natural game preserves of this favoured land yielded treasures to the naturalist and the sportsman of greater value and in greater profusion than any other country in the world. True, the game has not yet all gone, but never again will the astonished traveller set eyes upon those multitudes of living creatures, whose countless masses stretched from point to point of the horizon, and whose variety surpassed the limits of the imagination. At the present day one must work hard and trek far to obtain even moderate sport. Everything has changed now, even from what it was in the writer's younger days, when the Low Country still teemed with many varieties of big game. Such, however, was the wealth of game which this country held, that, notwithstanding all the destruction that took place, a certain quantity still remains. As there is no doubt that the prospect of obtaining good sport in any country offers a great inducement to intending visitors and settlers whose tastes lie in that direction, it therefore becomes a duty on the part of any modern writer upon the subject to give as accurate an idea as possible of the sport likely to be obtained.

In the present instance, then, the reader, be he prospective visitor or settler, must at once banish from his mind any lingering idea he may have that the Transvaal is any longer a "grand country for sport," because this is not the case. Naturally enough, the newcomer who perhaps has never shot anything bigger than a cock-pheasant in the Old Country will consider the sport which the Transvaal still affords better worth having than would one who, like the writer, has known the country in its palmy days, and has hunted the biggest game in far distant Central Africa. Nevertheless, it *is* still possible to obtain fairly good sport—particularly with birds—in the open or shooting season (which usually lasts from May 1st to August 31st*), and residents are generally very



A "FLYING CAMP" IN THE BUSH.

HUNTER'S CAMP IN THE LOW VELD (Simana Kopjes).

(* Power is vested in His Excelleney the Lieutenant-Governor, advised by the Legislative Council, to proclaim such periods "open" and "close" as he may determine. Much controversy has of late taken place on the subject of the most suitable periods, but the usual shooting season is as given above, or from May 15th to September 15th for buck and birds.)

willing to assist a "new chum" towards this end. *Imprimis*, however, it must be borne in mind that stringent game laws are in force throughout the Colony, and that under Ordinance 29 of 1902 certain animals and birds are specially protected as "royal game" throughout the year. The following is the list of the proclaimed species :—

A HUNTING CAMP IN THE LOW COUNTRY, TRANSVAAL.

Schedule C.

Elephant
Hippopotamus
Buffalo
Eland
Giraffe
Kudu
Red Hartebeeste
Lichtenstein's Hartebeeste
Sassaby
Rhinoceros
Quagga
Zebra
Roan Antelope
Sable Antelope
Brindled Gnu
White-tailed Gnu
Ostrich
Crested Crane.

The Oribi was placed on the Schedule on June 16th, 1904. This official list is of interest, as containing the names of two species *which never existed in the Transvaal*—viz., Lichtenstein's Hartebeeste and the Quagga, the latter having been for years extinct in South Africa! Schedule A of the above Ordinance contains a list of the birds which may be shot during the open season (this list also is incorrect), including some ten species of Francolins (locally called partridges and pheasants), a coorser, two guinea-fowl, eight species of bustard (called Paauw and Korhaan), four of sand-grouse, twelve of ducks, and three of geese. Schedule B of the Ordinance contains a list of the animals which may be shot during the open season, comprising three species of hares, fourteen of antelopes (locally "buck"), and two wild pigs. It will thus be seen that legally the holder of a licence to shoot (which costs £3 for the whole season, or £1 for any two weeks of the season) has a choice of some forty game birds and nineteen antelopes and other game to provide sport for his smooth-bore and rifle.

For the purposes of this article, we may consider the country as being divided into three more or less clearly defined areas—viz., the High Veld, having an elevation of 4,000 ft. and over; the Middle Veld, from 1,500 ft. to 4,000 ft.; and the Low Veld, all under 1,500 ft. No arbitrary line can be drawn that shall make an absolutely correct division of this nature, not even if we take farm boundaries, for it frequently happens that High and Middle Veld or Middle and Low Veld may be included within the boundaries of one farm. Accepting this division, however, for our present purposes, the distribution of the game may be roughly described as follows :—

Blesbuck	High Veld.
Duiker	High, Middle, and Low Veld.
Red Duiker	Middle and Low Veld.
Klipspringer	High, Middle, and Low Veld.
Oribi	Middle Veld and Upper Low Veld.
Steinbuck	Low Veld.
Grysteinbuck	Middle and Low Veld.
Waterbuck	Low Veld.
Reedbuck	Middle and Low Veld.
Mountain Reedbuck	High and Middle Veld.
Vaal Rhebuck	High and Middle Veld.
Impala	Low Veld.
Springbuck	High and Middle Veld.
Bushbuck	Middle and Low Veld.
Bush Pig	Middle and Low Veld.
Warthog	Low Veld.
Hares	Principally Middle Veld.

Of the scheduled game birds two specimens of Francolin (partridges), two bustards, two geese, and all the ducks are found on the High Veld. With two exceptions, all are to be met with in the Middle Veld, and nearly all in the Low

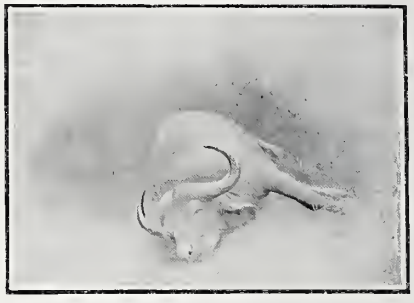
A HUNTING WAGON.

Veld—i.e., if we include under this head a tract of country embracing the foothills of the mountain ranges, and which may be called Upper Low Veld. The

A "BAG" OF LIONS.

two exceptions mentioned above as being absent from the Middle Veld are the Kori Bustard and the Crested Guineafowl (*N. edouardi*), neither of which I have seen out of the Low Veld, although I quite think the Kori Bustard may often, in some localities, be found on higher ground. The most widely-distributed of the Francolins in the Transvaal is Le Vaillant's Francolin (*Francolinus levaillanti*), locally known as the Red Wing Partridge. It is very similar to the Orange River Francolin (*F. gariepensis*), but is slightly smaller, and rather darker in colour. They are the best sporting birds in the country, as they lie well, and have a strong and sustained flight. They are particularly partial to grassy slopes and hillsides, and to low grass-covered rocky kopjes. They are heavier birds than the English partridge, but are not to be compared with it as table birds. Another excellent sporting bird is the Grey Wing (*F. afer*), a bird about the size of the Home partridge. They are somewhat quicker on the wing than the Red Wing, though less able to bear a sustained flight. Their habits are very similar to those of the Red Wing, but usually, in the same stretch of country, will be found lying higher than the latter bird. The Pileated Francolin (*F. pileatus*) is of less frequent occurrence, and though similar in habits is seldom found so far from water as the former species. It is about the size of the Red Wing. The Coqui Francolin (*F. subtorquatus*), is a very small but beautifully-coloured bird, easily distinguished by the hawk-like transverse bars on the breast and under parts. They are partial to low bush country, and will lie very closely, requiring a steady, well-trained pointer to put them up. They are most delicious eating. They roost on the ground at night, as do the Red and Grey Wings.

The so-called pheasants of this country can hardly be considered good sporting birds. They are never found far distant from water, nor outside of thick cover, in which they will run like hares rather than take wing. When forced to get up they utter a succession of harsh screams, and frequently settle in the trees. They are decidedly inferior as table birds to the "partridges." The commonest form is *F. adspersus*, the Red-billed Francolin. Another pheasant, the largest of the group, is Swainson's Francolin (*Pternistes swainsoni*).



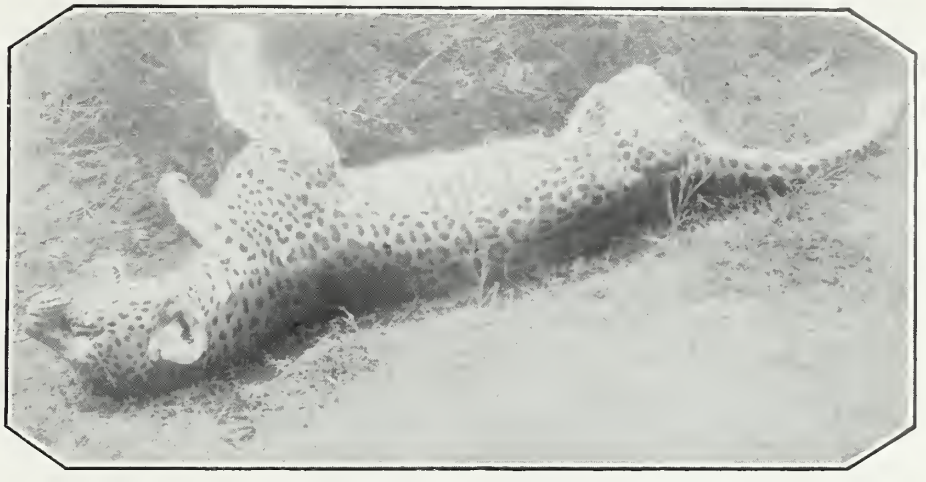
DEAD BUFFALO.

Guinea fowl, when young, are grand table birds, but cannot be considered good sporting birds. They run at a great pace, and if induced to rise will carry away a lot of shot. The best method of shooting these birds is when running on the ground, using a little rook rifle. They are a difficult mark when dodging at speed through the bush, and one requires to hold straight and fire quickly. At night they roost in the trees by the river banks. They are terribly destructive birds in the cornlands. Neither snipe nor quails are much molested in this country, and

THE WRITER'S PET LION, "LEONA."

neither appear on the official list of protected birds to shoot which a licence is required. Probably neither bird is considered large enough to be worth powder and shot. The quails are partially migratory. There are two species, the Common Quail and the Harlequin Quail (*Coturnix delegorguei*), the latter being the larger bird, and less frequently met with. The tiny Hemipode or Bush-quail (*Turnix lepurana*) is only between five and six inches in length.

PET LION HOMEWARD BOUND.



DEAD LEOPARD.

They keep in pairs, and are seldom found far from water. The Sandgrouse, of which the so-called Namaqua Partridge (*Pteroclurus namaqua*) is the most widely distributed form, lie scattered over the veld during the day, generally in pairs, but at drinking time assemble in enormous flocks, and afford some very pretty flight shooting.

The first and grandest of all African game birds is held by general consent to be the Kori Bustard (*Eupodotis kori*) the "Gom-Paauw" of the Boers. Measuring from 4 ft. 6 in. to 4 ft. 8 in. in length, and weighing sometimes as much as 50 lbs. (I have seen one shot which measured 4 ft. 11 in., and weighed after the loss occasioned by the wound from a ·450 bore rifle, 56 lbs !), it can easily be understood that it is looked upon as a grand prize. It is a stately and handsome bird, with its strongly-crested head, powerful legs, and rich plumage of mottled greys and browns. I have never met with the bird elsewhere than in open bush country, to which it is undoubtedly most partial. It is partially migratory, and hence it follows that its range is a wide one. Its principal food consists of beetles and other insects, but it also devours seeds of several kinds, and is said to be partial to the gum which exudes from the acacia trees—hence its Dutch name, which signifies "gum peacock." They are exceedingly wary birds, and seldom allow one to approach nearer than 100 to 150 yards; a rook rifle is therefore the best and most sportsmanlike weapon to use against them. They are excellent eating, but in the summer become so exceedingly fat as to render them somewhat rank.

AFTER A LION HUNT.

The smaller Stanley and Ludwig's Bustards (*Neotis caffra* and *N. ludwigi*) are, I consider, the most delicious table birds in South Africa. They are smaller birds than the Kori, measuring about 3½ ft. in length and weighing from 12 to 18 or 20 lbs. They are partial to open downs and high tablelands. They are very wary, but by judicious stalking or cunning circumvention can be secured with a smooth bore, especially if the sportsman takes the field on horseback. A certain "find" for these birds is on the new "burns" during the winter, where they congregate for the purpose of picking up the insects which have been destroyed by the fire. The remaining bustards found in this country are again much smaller birds, measuring from 15 to 20 inches in length. They are all known locally as "Korhaans." The fine bird styled the Bush Korhaan, but scientifically the Rufous Crested Bustard (*Lophotis ruficristata*) is a grand sporting bird. It frequents fairly close bush country, and is a far less persistent runner than the other Korhaans. It gets up very quickly and silently, and though its flight is never long sustained it is very swift and erratic. The soft downy under-

feathers of the body are of a delicate rose pink tint, the upper plumage is mottled brown and black, and breast and under parts are deep black. It is very excellent as a table bird. The Vaal Korhaan (*Trachelotis cerulescens*) is another well-known form, and handsomely plumaged. It is more partial to open veld than the Bush Korhaan. This bird also carries the singular rose pink downy underfeathering, as does the former species, but in both cases this pink flush soon fades after death. The Senegal Bustard (*Trachelotis barrowi*) I have never met with in the Transvaal, though I understand it is found in the Marico district. The African Black Bustard (*Compsotis afra*) is another form which I have not met with outside the Cape Colony. A very similar bird, the White Quilled Bustard (*Compsotis leucoptera*) usually goes by the name of the Black Korhaan in this Colony. It is quite one of the handsomest of the group, with variegated upper plumage, jet black breast and under parts, white wing pinions in strong contrast to the jet black colour of the rest of the wings, and white collar and ear coverts. He is, moreover, in a sense an excellent sporting bird, yet perhaps none of the game birds are more cordially disliked. The fact is, he is an inveterate sport-spoiler, for he is one of the noisiest of the fowls of the air; and his noise is of the most aggravating description—a continual harsh, nerve-destroying cackle, or something between a cackle and the tune of a long ungreased axle. The moment he flushes, he breaks out into this "song," and continues it throughout a high short flight, until he settles again, after having thus disturbed half the game in the neighbourhood. Two fine birds locally called the Dikkop Plovers are often seen in this Colony, and form a very welcome addition to one's larder. They are really the Vermiculated Thick-knee (*Œdicnemus vermiculatus*)—an altogether atrocious cognomen—and the Cape Thick-knee (*Œ. capensis*). They are exceedingly handsome birds, lie close, and give a good sporting shot when they get up, as their flight is singularly quick. Wild duck, teal, wigeon, etc., are very welcome additions to the sportsman's bag, but are far less frequently seen than one would imagine. They are only to be found in large numbers on the small inland lakes (or "pans" as they are termed), and along the courses of the larger rivers, or wherever extensive marshy tracts occur. Ten or twelve species of ducks are found in this Colony — the red-billed Teal (*Pacilonetta erythrorhyncha*), Yellow-billed Teal (*Anas undulata*), Hottentot Teal (*Nettion punctatum*), Cape Teal (*Nettion capense*), South African Pochard (*Nyroca erythropthalma*), White-masked Tree Duck (*Dendrocygna viduata*), Knob-billed Duck (*Sarcidiornis melanonota*), South African Shell Duck (*Cassarca*), Black Duck (*Anas sparsa*), White-backed Duck (*Thalassornis leuconota*), and the Makua Duck (*Erismatura makua*). There is also a Shoveller (*Spatula capensis*). The most common forms are the Red-billed Teal, a fine bird, some 20 inches in length; the Yellow-billed Teal, the largest of the group in South Africa, measuring 22 or 23 inches; the Black Duck, of very frequent occurrence; and the exceedingly handsome South African Pochard, a bird nearly as large as the Yellow-billed Teal. The latter I consider the best table bird of the lot, and during certain seasons they get very fat. All give very good sport on anything like open water, but when found on narrow bush-margined streams and rivers the reverse is the case, as they either get up long before the sportsman is within range, or they are suddenly surprised at too close quarters behind a bend in the river, in which case one must either loose off sooner than the ethics of good

DEAD BUSHBUCK.
(Length of horns, 16 inches.)

BUSHBUCK (*Tragelaphus scriptus sylvaticus*).

LION TROPHIES FROM THE IMBABATI RIVER.

sport permit, or be content to lose them, for in a moment they will be out of sight behind the next bend. The common Cape Teal—or, as it is usually called, the Cape Wigeon—is, I believe, sufficiently plentiful, though personally I have met the bird but rarely in this Colony, while the Shoveller (of very common occurrence in the Cape Colony) and the Makua Duck I have never met with at all in the Transvaal. Since the above was written, there is a movement on foot to have wild duck removed from the list of game birds, owing to the fact that their migratory habits cause them to disappear from their usual haunts during the open season, only to reappear when the season closes.

The geese, except from an ornithologist's point of view, are all-round unsatisfactory birds. I do not consider them good sporting fowl, and as table birds they are hopeless, the flesh being coarse and rank, and of very dark colour. The two larger species, the Spur-winged Goose (*Plectropterus niger*) and the Egyptian Goose (*Chenalopex ægyptiacus*) are, however, most handsome birds, and of large size; the adult male of Plectropterus carries a most formidable spur over an inch long on the wrist-joint. This bird is easily domesticated. The third recognised species of the *Anseres* is a diminutive creature, considerably smaller than a teal; it is known as the Dwarf Goose (*Nettapus auritus*), and attains a length of from 13 to 15 inches. It is an exquisitely coloured little thing, its upper plumage being dark glossy green, as is the top of the head, the wings have a white bar across them, the chest and sides are rufous, the former handsomely barred with black, the throat, cheeks, under parts and front of the head pure white. The bill is orange in the male and olive green in the female, the latter being of duller colouration throughout. I have not met with this bird in the Transvaal, but in the Cape Colony and on the Zambesi I have found them excellent eating.

SKULLS OF WART-HOG,

shot by the writer in the Malamiri Bush in 1897. (Tusks, 15½ in.)

I may here remark that a bird which I have included in the list of ducks, the Knob-billed Duck (*Sarcidiornis melanonota*), is by many ornithologists

MARTIAL EAGLE

(*Spizætus bellicosus*),

hung up by the legs.

classed amongst the geese; it is in fact a connecting link between the two groups, but I am of opinion that its nearest affinities are with the ducks. It is a large bird attaining a length of 24 to 26 inches; the peculiar knob which extends down the upper mandible, and from which the bird derives its name, is black in colour, only present in the male bird, and then only during the breeding season. It is a very fair table bird.

The hares of the Transvaal are the Cape Hare (*Lepus capensis*), the Rock Hare (*L. saxitilis*), and the Red Hare (*L. crassicaudatus*), the respective local Dutch names being Vlakte Haas, Kol Haas, and Klip or Rooi Haas. The latter is a poor sporting animal, taking refuge amongst the stones and boulders when pursued, in fact being never found elsewhere than on rocky ground. The Rock Hare is nearly as bad, but the Vlakte Haas will give an excellent run. In colour they are very similar to the English hare, but are much smaller. They are strong on the legs, and have a good turn of speed, so that altogether they would be really good sporting creatures but for their habit of going to earth, which they will always do when hard pressed.

With regard to the antelopes of the country it is a little difficult to give reliable information. On the High Veld such buck as are now to be found are all on private property, and strictly preserved. My experience, however, has been that very few of the farmers, if courteously approached, will refuse permission to anyone desirous of obtaining a couple of head. In this case the owner will himself make all arrangements in connection with the day's sport. The Middle Veld carries a greater variety of game, but the same holds good, most of the land being private property, and the express permission of the owner being necessary to enable anyone to shoot. On the other hand, there are in the Middle Veld considerable tracts of country in the hands of the Government, called Crown Lands, and as I have elsewhere shown, an extra sum of 20s. per season must be paid to enable one to shoot thereon. Probably the best of the shooting is obtainable on these Crown Lands, much of which consists of hilly or mountainous country, the chosen home of the Vaal Rhebuck and the Mountain Rhebuck, locally (and erroneously as usual) called the Rooi Rhebuck. The pursuit of these animals offers most pleasurable excitement to the sportsman, who requires to be sound in wind and limb in order to

THE "KING OF ANTELOPES," THE KUDU.

(Length of horns, 59 in.; space between tips of horns, 14 in.)

negotiate the rough hills and mountain krantzes where the quarry loves to dwell, and to exercise caution and cool judgment afterwards to enable him to circumvent and finally bag the wary game. Duiker and Grysbuck (Grys

steinbuck) will only be found on the flats and grassy slopes, being particularly partial to country covered with low thick scrub. A small rook rifle is

KUDU BULL.

(Length of horns, 60 in.; space between tips, 7½in.)

a most excellent weapon for bagging these little buck. They do a great deal of harm to growing crops, and very little difficulty will be experienced in obtaining permission to shoot them.

The meagre sport now obtainable in the very restricted areas of the Low Veld which have not fallen within the scope of the Government's "Game Reserves" scheme, requires a considerable expenditure of time and money if any return whatever is to be got. If, however, the visitor or settler from some remote part should decide on a little shooting trip during the open season, he should write to the Resident Magistrate at Lydenburg, Pietersburg, or Barberton, and from them will certainly receive courteous replies, and no doubt full information, up to date, of the possibilities of sport in their district, and of how best to obtain it. I will only remark here that much of the game which he will find in these areas can be better secured, and at less expense, in the Middle Veld, while the bird-shooting in the latter area is incomparably superior to anything he will get in the Low Veld. Moreover, the outfit he would require in the latter case would be far more complex than if he shot in the Middle Veld. The only game he could obtain in the Low Country which are either not to be found, or only in inappreciable numbers, in the Middle Veld are Bush-pig, Wart-hog, Steinbuck, Bushbuck, Reedbuck, Impala, and Waterbuck. Of these Reedbuck and Waterbuck are now pretty generally protected everywhere (the district R.M.'s, as mentioned above, would of course know exactly how far any amendments to the Game Ordinance affected, each one, his own particular district), and Impala are exceedingly scarce anywhere outside the reserves. In the wooded kloofs amongst the foothills, in the upper Low Veld, excellent Bushbuck and Red Duiker ("Msumbi") shooting is obtainable, but good bush dogs are *sine quâ non*. Anyone, however, shooting in the Middle Veld in the neighbourhood of such country could obtain this sport equally well. In the Low Country, of course, there is always the off-chance of picking up some of the carnivora—a lion, leopard, cheeta, hyaena, or wild dog. But, be it remembered, I use the word an "off-chance." This is very true of a lion, because in the first place lions are nocturnal animals, and except by the merest good luck are seldom met in the day time. They require, in fact, to be specially and systematically hunted; and in the second place the lions found outside the reserves are only wandering brutes which have strayed away in search of food to the confines of civilisation. Before long, however, as they are bred in the Reserve, they will go further afield and in greater numbers, so the embryo lion-hunter need not despair. But at present it would be most misleading to hold out the possibility of

DEAD KUDU BULL.

sport in this direction as an inducement to anyone to visit the Low Country. Leopards and Cheeta are rarely seen. The former are very cunning and wary, and require also to be systematically hunted. They are fairly plentiful in many districts comprising the Middle Veld. A shot at wild dogs and hyaenas, however, can be easily obtained, though some knowledge of the habits of the latter is necessary. Bush pigs

TROPHIES FROM THE HUNTING VELD.

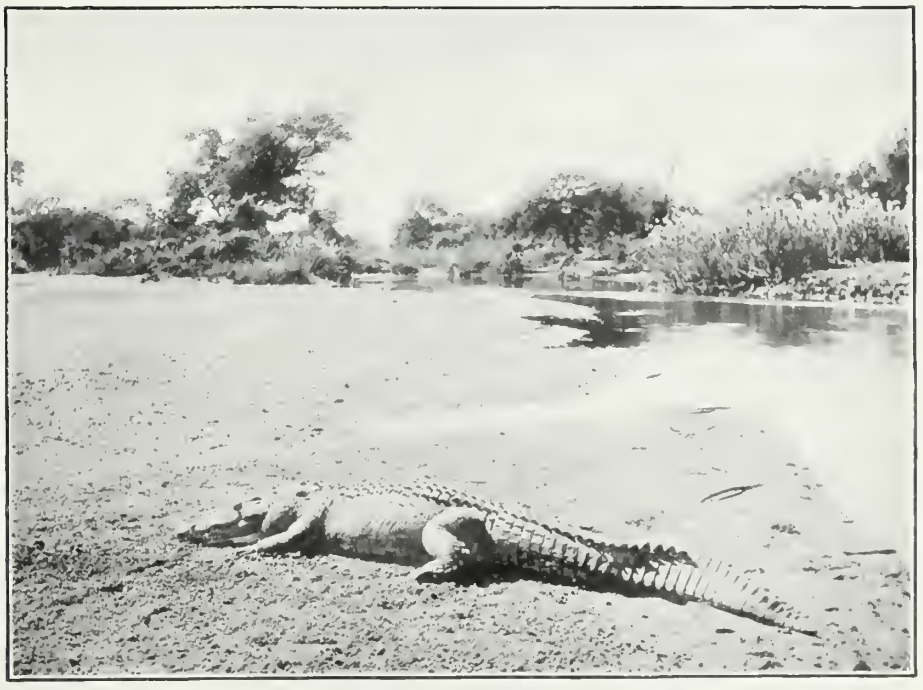
are found in similar country to Bushbuck ; dogs are necessary to the attainment of successful sport with these animals. Wart-hog will rarely be met with outside the reserves.

Want of space again prevents me from entering into details as to how one should set about the task of securing a shot at the larger carnivora, but there are standard works upon the subject to be obtained, to one or other of which I would refer the intending sportsman.

Shooting in this country is almost invariably done on horseback, as the distances to be traversed are usually considerable. Sporting dogs are best obtained out in the country. The climate is so parched and trying that scent is usually very "catchy," and, in addition, birds are given to running badly, and the ground is usually very rough a ' of great extent, the result being th.. dogs out here are very seldom as thoroughly broken as at home. Nevertheless, and probably on this account, the colonial-bred dog does his work well—work that speedily knocks his finer-bred, better trained confrères out of time—and comes "up to time" day after day with willingness and alacrity, until his feet give out. They can do on very little water, also another important point in their favour in this dry and thirsty land. In my opinion the most useful all-round dog is the pointer. His smooth coat gives him a great advantage in the tangled undergrowth over the rough-haired setters, spaniels, and retrievers. For bush work—*i.e.*, driving bushbuck, 'msumbi, etc., out of wooded kloofs, and duiker from dense low cover—almost any mongrel is good ; in fact, very often the more mongrel-bred a dog is, the better bush-dog he makes. Harriers are not used here so much as in Cape Colony, where I have had some very fine sport with these dogs. Coursing is a form of sport not very often indulged in out here, but even if one wishes to take it up—and some good runs can be *guaranteed*—the colonial-bred dog is the most useful. He is not so fast as the Home dog, but his feet are harder, and he lasts better than the softer dog from a smoother and cooler country.

The question of arms and ammunition is another point which has been fully dealt with in many books on sport. The only weapons that a sportsman coming into the Transvaal at the present day requires to bring with him are : (1) A modern-pattern magazine or double rifle, of small bore, sighted to 500 yds. (or 1,000 yds. if preferred), with springs to all leaf sights, also cartridges with a selection of "soft-nosed" and solid bullets ; (2) a 12-bore double shot-gun, cylinder first barrel, modified or full choke in the second, top-lever action, treble grip, pistol hand, and either hammerless or low-action hammers. (3) I strongly recommend the purchase of a small single-barrelled rook rifle. They are excellent for practice and quite powerful enough to kill anything up to a duiker. I have often killed bushbuck with them. (4) If the sportsman is a collector of natural history specimens he should not forget a ·420-bore collector's gun, single. All properly prepared specimens sent to Dr. Gunning, of the Transvaal

BULL GIRAFFE SHOT NEAR LIMPOPO RIVER.
(The three huntsmen may be taken as typical Boers.)



CROCODILE SHOT ON THE LIMPOPO RIVER, ZOUTPANSBERG.

SPOILS OF A KUDU HUNT, ZOUTPANSBERG.

Museum, will be very welcome, and the genial Doctor, to whose untiring energy the success of that institution is mainly due, will be quite prepared to pay for such specimens as he requires. For the smooth-bores E.C. or Schultze's powder is the best, and Nos. 2, 5, and 6 the most useful shot. All ammunition for both rifles and smooth-bore (except for the rook rifle and collector's gun, or for any special pattern rifle of larger bore) is obtainable in this country.

All weapons, *especially* if provided with pistol-grip, should be *strapped right over the comb*. This precaution will save many a broken stock when riding at speed in this land of ant-bear holes, or climbing krantzes after Vaal Rhebuck and Klipspringer. *Verbum sap.!*

In conclusion, I cannot deprecate too strongly the unsportsmanlike custom practised in this country of shooting buck with a smooth-bore. No man with true sporting instincts will do it, except it is an urgent case of meat required "for the pot"—the only possible excuse, although a rather lame one. And it is a singular thing that—at the present time, when the question of game preservation is so prominently before the country—the Transvaal Game Preservation Association does not use every endeavour to obtain Government sanction to the prohibition of shot guns for killing buck, instead of, as heretofore, wasting time by indulging in an excess of vexatious controversies, with the result that its work is largely discredited in the country, instead of receiving the whole-hearted support it would otherwise deserve.

The Zoology of the Transvaal.

CLASS *MAMMALIA* (MAMMALS).

IT seems scarcely necessary to preface my remarks under this section by pointing out how very inadequate is the space at my disposal for dealing with the subject. A whole volume of the size of the present one might well be devoted to the consideration alone of the mammal and avi-fauna of the Colony. I am compelled, therefore, to confine myself to merely outlining the principal orders, families, and genera of the mammals, birds, reptiles, etc., adding here and there a few brief remarks upon certain species.

The Transvaal may be said to form, zoographically, a portion of the southern division of the great Ethiopian sub-region of the Continent, a division which embraces the whole of the Southern Continent as far north as the Zambesi River and the Angola Province. This division might appear to be again divisible into sub-divisions, but that the special peculiarities in the distribution of species are scarce clearly enough defined to justify this. For our present purpose, however, which limits us to the arbitrary boundaries of the Colony, we may consider it as being such a sub-division. Its distinctive zoographical features are negative in character, referring rather to forms which are absent from the Colony than to those which are peculiar to it. This absence of certain forms is, as might be expected, more marked in the case of the mammals than of the far-flying and consequently wider-ranging birds. The principal mammalian forms which occur elsewhere in the southern division, but are absent from the Transvaal, are, in the west and north-west, the Gemsbuck

CHACMA BABOON
(*Cynocephalus porcarius*).

(*Oryx gazella*), Puku (*Cobus vardoni*), Lechwe (*Cobus lechè*), Situtunga (*Tragelaphus spekei*), and the little Asse Fox (*Canis chama*). In the north-east, east, and coast belts are Lichtenstein's Hartebeeste (*Bubalis Lichtensteini*), Inyala (*Tragelaphus angasi*), Peters' Oribi (*Oribia hastata*), Blue Duiker (*Cephalophus monticola*), Livingstone's Suni (*Nesotragus Livingstonianus*), Tree Hyrax (*Procavia arborea*), and the Suricate, or Mierkat (*Suricata tetradactyla*).

LION (*Felis leo*).

SUB-CLASS: EUTHERIA.

Order: PRIMATES.

Sub-Order: ANTHROPOIDEA.

Family CERCOPITHECIDÆ. None of the anthropoid apes are represented in the Colony, and even the monkeys are confined to but three species of the two genera, *Cercopithecus* and *Cynocephalus*. To the former belong the well-known Vervets (*C. lalandi*) or "Blue Monkeys," as they are usually called, also the rare and beautiful Simango or Simankwa (*C. samango*). This handsome monkey is very local in its distribution, and is shy and unsociable in disposition. The only representative of the genus *Cynocephalus* is the Chacma or Dog-faced Baboon (*C. porcarius*). They are essentially mountain dwellers, but nevertheless are found in large numbers amongst the detached stony kopjes of the Low Country, and I have seen large numbers of them far down in the Bushveld, along the heavily-wooded river banks, and many miles away from any hills. These latter always appear to me to attain an unusually large size, and an unusual development of mane. They are omnivorous, and devour fruit, corn, crustaceans, insects, eggs, molluscs, etc.

Sub-Order: LEMURIDÆ.

Family LEMURIDÆ. This family is represented by two species of a single genus, *Galago* (Long-tailed Lemurs), these being the Great Galago (*C. oressicaudatus*), of rare occurrence, and the Maholi Galago (*G. Maholi*), styled by the colonists Night Ape, and Bush-baby. The leaping powers of the Galagos are most remarkable, and might almost be called incipient flight. Their movements are singularly quick and noiseless.

FENNEC.

(From photo by L. T. GRIFFIN, Pretoria.)

Order: CHIROPTERA.

Sub-Order: MEGACHIROPTERA.

Family PTEROPOPIDÆ. I believe the large Fox Bats or Fruit Bats of this family are represented by but one genus in the Colony—Xantharpyia—but we have four species of *Epomophorus* (Epaulette Fruit-bats). Their habits are but little known; they are strictly frugivorous, fly at dusk, and are said to dwell indiscriminately in either caves or trees.

Sub-Order: MICROCHIROPTERA.

This group is more numerously represented.

Family RHINOLOPHIDÆ. Includes the Rhinolophs (Horseshoe-nosed Bats), and the genus *Hipposiderus* (Leaf-nosed Bats). The Greater Horseshoe-nosed Bat (*R. ferrum-equinum*) has a wide distribution, and is fairly plentiful in parts of the Colony. *R. capensis* is, however, a more commonly known species. These bats, together with the leaf-nosed, are the most highly organised of all the insectivorous bats. The Southern Leaf-nosed Bat (*Hipposiderus capensis*) is the best known form of this genus in the Transvaal. *H. commersoni* has, I understand, been observed in the northern Zoutpansberg district.

Family NYCTERIDÆ. The false Vampires and their allies are represented by two genera—*Megaderma*, the false Vampires, and *Nycteris*, the latter having well-developed tails. Five species are indigenous.

Family VESPERTILIONIDÆ.—The typical bats belonging to this family are represented in this Colony by several genera, of which *Vesperugo*, *Vespertilio*, and *Miniopterus* claim the greater number of species.

Order: INSECTIVORA.

Sub-Order: INSECTIVORA VERA.

Family MACROSCELIDIDÆ.—Referring first to this very interesting family, which embraces the jumping Shrews, or Elephant Shrews, as they are often called on account of the singular proboscis-like elongation of their snouts, we have an insectivore which approximates in form to the Jerboa or Cape Jumping Hare. They may be considered as the African representatives of the Tree Shrews of the Oriental regions, with which they agree in the relatively large size of the brain and in certain anatomical features, but

AFRICAN POLECAT (*Ictonyx zorilla*).

from which they differ in many other particulars, and in their habits, which are terrestrial instead of arboreal. With but one exception, the typical Jumping Shrews of the genus *Macroscelides*, represented here by the common South African form *M. typicus*, have 42 teeth, and five toes on both fore and hind feet. They live amongst grass and bush, and only leave their hiding-places at dusk in search of their insect food. A far more rare species of this genus is the Rock Jumping Shrew (*M. tetradactylus*). It is considerably larger than the foregoing species, has but 40 teeth, the last molar on each side of the lower jaw being absent, and only four toes on the hind feet. The range of this interesting little creature is at present very uncertain. It was thought at one time to be confined to the Mozambique coast districts, but it has been collected in British Central Africa, and I have taken three specimens on the Lebombo Mountains, and one on the Mashashimala range, north of the Oliphant's River. Much, in fact, remains to be ascertained about the Jumping Shrews in this Colony, and I am convinced that further research will establish the existence of at least one species of the genus *Rhynchocyon*, the long-nosed Jumping Shrew, which is furnished with an actual proboscis. This creature attains a total length of 15 inches, including the tail.

Family ERINACEIDÆ. — One species of Hedgehog only is indigenous.

Family SORICIIDÆ.—The true Shrews are represented by only one genus, *Crocidura* (the Musk Shrews), there being no representative of the genus *Sorex* (the Red-toothed or typical Shrews) in the country. The Musk Shrews are nocturnal in their habits, and are partial to cultivated lands. Their food consists of insects of various kinds. As in the case of the Jumping Shrews, there is little doubt that there is a wide field for research in connection with the *Crociduræ*. Some 87 different species of these animals have been described from various parts of the world, their range embracing Central and Southern Europe, Africa, and Asia.

XERUS GROUND SQUIRREL.

Family CHRYSOCHLORIDÆ (the Golden Moles).—This family is represented by some five species. So far as is at present determined, the Golden Moles are confined solely to South Africa, where some seven species have been determined, four of which I have collected from the Transvaal. These pretty creatures have much resemblance to the true moles, but their bodies are relatively shorter and thicker, the head deeper, and the snout more obtuse. The eyes are entirely covered by the soft fur, in which the ears also are deeply buried. The whole form is thus perfectly adapted for its fossorial habits, especially by the peculiar structure of the forefeet. The hind feet retain a normal form, but the forefeet are specially modified for digging purposes, having only four toes, the two middle ones being armed with enor-

BURCHELL'S ZEBRA (*Equus burchelli*).

mously triangular claws of great size. They thus differ greatly from the true moles, whose forefeet have assumed a hand-like form, with the addition of a sickle-like bone close to the thumb. The typical species have 40 teeth, but some others have lost the first pair of premolars in each jaw. There are four digits on the manus, whereas the true moles have five. The scientific as well as the popular name of these moles is derived from the rich metallic lustre of their fur, which gleams with various shades of green and golden bronze.

Order : CARNIVORA.

Sub-Order : FISSIPEDIA.

Division : ÆLUROIDEA.

This important order is well represented in this Colony by six families, embracing seventeen genera, as follows :—

Family FELIDÆ.

Genera *Felis* and *Cynælurus*.

Family VIVERRIDÆ.

Genera *Viverra*, *Genetta*, *Herpestes*, *Helogale*, *Crossarchus*, and *Bdeogale*.

Family PROTELIDÆ.

Genus *Proteles*.

Family HYÆNIDÆ.

Genus *Hyæna*.

The genus *Felis* is represented by five species. The Lion (*Felis leo*), which at one time ranged all over the Transvaal, has now a very much restricted habitat, being confined to areas in the north-east, north, and north-west of the Colony. They are most plentiful in the Government reserves, where, since their inception in 1902, a period of four years, but few have been killed. Under the former Government any sportsman wishing to hunt carnivorous animals was permitted to enter the Reserve for that purpose, as many as eight to ten lions being shot in one season. It should be unnecessary in these enlightened days to state that there is but one species of lion throughout Africa, though individuals differ greatly from one another in general colouration, and still more so in development and colour of the mane in the male sex. The causes that lead to this have never been satisfactorily explained. The length of a full-grown lion is a question that has aroused considerable controversy. As a matter of fact it is wonderful how the length of an animal or of a pair of horns will shrink under a tape-line. The writer has shot a large number of these animals, the majority of which he has carefully measured. The conclusion he has arrived at is that for every lion which, fairly measured, proves to be 10 feet or over, there will be found twenty or probably more which will not measure more than from 9 ft. to 9 ft. 6 in. Animals of over 10 ft. in length are extremely rare. The standing shoulder height is from 3 ft. 4 in. to 3 ft. 8 in. The Leopard (*Felis pardus*) is widely distributed all over the southern division, and is still found in the Transvaal wherever the necessary requisites in the shape of thick cover, water, and abundant food are to be found. Although there is an enormous difference in point of size, in build, and more particularly in colour and markings between the extreme forms of this animal, all modern naturalists are now agreed that they are referable to but one species. They are the wariest and most cunning of the Felidæ, and from their habit of

BURCHELL'S ZEBRA (*Equus burchelli*).

killing indiscriminately—and not, as do the other Felidæ, merely what they require for food—they are terribly destructive when they take up their abode in the neighbourhood of a native kraal or a stock-farmer's homestead. Notwithstanding, however, leopards which live amongst the krantzes of the mountain ranges have often to fall back upon very different prey to fat sheep or goats, and devour large numbers of "rock rabbits," as the coneys or Hyraces are locally termed. The Serval (*F. serval*), commonly known as the Tiger Cat, is of frequent occurrence in wooded localities. They often lie up in reed-beds and patches of long grass or low bush, and are found on mountain slopes at an elevation of 4,500 ft. This species

BLESBUCK (*Damaliscus albifrons*).

is of fierce disposition, and does not take kindly to captivity. Large specimens attain a length of about 4 ft. 8 in., and they are very destructive to young game. It is interesting to note the evidences of near relationship to the Cheeta (see below) and to the Lynxes. As regards the Cheeta, this is demonstrated by the fact that the body spots are simple as in the Cheeta, the paws are relatively much smaller than is the case with other Felidæ, and the legs are very long, which is characteristic of both Cheeta and Lynx. Furthermore, the Serval almost invariably pursues and runs down its prey instead of lying in wait and springing upon it. In regard to its affinities with the Lynx, in addition to the above-mentioned characteristic length of leg, it will be noticed that at the apex of the ears there is a distant approach to the tuft which is so marked a feature in the latter animal. Two other representatives of the genus in this Colony are the Caffre Cat (*Felis caffra*) and the Bush or Jungle Cat (*Felis nigripes*). Both are liable to much variation in colour and markings. *F. caffra* is usually darkish grey, which sometimes assumes an ochreous tint. It is more or less plainly striped, the markings becoming more distinct on the quarters and legs. The nose and cheeks are fulvous, throat and chest pale yellow, strongly marked with dark bands. The rather long tail is ringed with black, under parts pale fawn. It attains a length of 3 ft. 6 in. *F. nigripes* is a still more handsome beast, its coat, which is of very fine texture and soft, being usually rich dark reddish grey, the muzzle, throat, chest, and belly warm rufous, faintly barred. In some specimens the body is striped with reddish brown markings, but quite as frequently no such stripes are visible. The legs are usually well-marked with dark brown bars, and the tail is ringed and has a black tip. The animal attains a length of about 3 ft. It frequents moist situations near marshes and dense reed coverts, but is often found at great altitudes—6,000 ft. and over. Both cats are exceedingly destructive to young game, and are of fierce and untamable disposition.

The last species of the genus *Felis* which claims our attention is the Caracal (*F. caracal*), called Rooikat by the Boers. This animal is specially worthy of notice, as forming a complete transition from the typical cats to the lynxes. In its long limbs, pencilled ears, and peculiar dentition, it agrees entirely with the lynxes, but in its less close fur, longer tail, and the absence of a neck ruff, it resembles the bush cats. The skull is singularly elevated at the crown, and the facial portion is short. There are only two premolars in the upper jaw, and the flesh-tooth of the lower jaw carries the rudiment of the heel which is found fully developed in the *Hyænidæ*. The Caracal attains a length of from 3 ft. to 3 ft. 6 in., with a shoulder height of 18 or 19 in. It is very fierce and practically untameable.

The second genus of the Felidæ is represented by the singular Cheeta or Hunting Leopard (*Cynælurus jubatus*), called by the Boer "luipard." It is of much interest to zoologists, as differing from the true cats (*Felis*) in having comparatively weak, blunt, and non-retractile claws, and also in the conformation of the upper flesh-tooth, which is a simple trenchant blade without the inner lobe which is common both to the true cats and the hyænas. It is for these reasons that the Hunting Leopard has been placed by itself in a separate genus. It may be remarked that the characters of the flesh tooth above mentioned indicate great specialisation, all the more primitive types of carnivorous animals possessing the inner lobe; while in respect of its non-retractile claws, it is a more generalised animal. It invariably runs its prey down, its lithe body and long muscular legs enabling it to attain a speed of which probably no other animal in the world is capable. In all cases I have observed they kill their prey by strangulation. Their average length is 7 ft. to 7½ ft. (male) and standing height 2½ ft. to 2 ft. 8 in. They are less nocturnal in their habits than other *Felidæ*.

Family VIVERRIDÆ. — Sub-family VIVERRINÆ (True Civets). —This sub-family is represented in this Colony by the African Civet (*Viverra civetta*). It is not very often seen, being strictly nocturnal in its habits, but nevertheless is of fairly frequent occurrence. It is of a solitary disposition, and hides during the day in patches of long grass and thick bush. It is very destructive, particularly in a henroost, and preys upon small mammals, birds, frogs, snakes, insects, and will even devour vegetable matter. I have never seen them take to water, but the natives say they can swim well. They readily climb trees. They are essentially digitigrade, and have five toes on each foot, the claws being semi-retractile. All the members of the

family *Viverridæ*, with the exception of the hyænas, have close affinities with the *Felidæ* in certain characteristics of the skull, the most important of these being that the auditory bulla is inflated into the form of a bladder, the internal cavity of which is divided into two compartments by a thin vertical partition of bone.

The Genets (*Genetta*) are represented by two species, the Feline (*Genetta felina*) and the Blotched Genet (*G. tigrina*). Their claws are shorter and blunter, and their bodies more slender than those of the civets, and there is a narrow bare surface along the under portion of the hind foot which further serves to distinguish the genets. They prey upon small mammals, birds, and reptiles.

Sub-family HERPESTINÆ.—The Mungooses (*Gen. herpestes*), at one time called Ichneumons, form a clearly-defined group of civet-like animals, which, however, differ in important particulars from the preceding genera. The sharp cusps on the teeth adapt them for an entirely carnivorous diet, and the claws are long, straight, and non-retractile. All the members of the group are plantigrade. The species common in this country are the Slender Mungoose (*Herpestes gracilis*) and the Caffre Mungoose (*H. caffer*), both with black tail-tips, and the Black Mungoose (*H. galera*).

The closely-allied *Helogale* (short-tailed Mungoose) differs from Herpestes in having only three premolar teeth, of which the anterior one is placed close up against the canine, with no intervening gap (as occurs in those other few true Mungooses which have but three premolars). The common form of this genus is *Helogale parvula*. *Cynictis* is also represented by *C. penicillata*.

The four-toed Mungooses are represented by the genus *Bdeogale*. The smooth-nosed Mungooses are represented by the genera *Crossarchus* and *Rhynchogale*. These latter differ from all the preceding genera in having no medium vertical groove between the nose and the lip. They have five toes on each foot, and *Crossarchus* differs from the other smooth-nosed Mungooses in having only three premolars on each side of the jaws, and in the under surface of the hind feet being quite naked. The Banded Mungoose (*Crossarchus fasciatus*) is widely

WHITE-TAILED GNU (*Connochætes gnu*). Shedding coat.

distributed from the Cape Colony to Mozambique, and the white-tailed Mungoose is found within our limits.

Family PROTELIDÆ.—The Aard-Wolf (*Proteles cristatus*) is the only representative of the genus, and this genus the only one of the family. The Aard-Wolf is indeed a singular creature, which though closely allied to the *Hyænidæ*, and more distantly related to the Civets, differs so markedly from them in many particulars as to be most generally regarded as the solitary representative of a distinct family. Its scientific name has been given on account of a long crest of erectile hairs along its back. The claws are long, blunt, and non-retractile, and there are five toes on the front and four on the hind feet, unlike the hyæna, each of whose feet have but four toes. Its dentition is little more than rudimentary in character, the teeth being 30 or 32 in number, and the cheek-series widely separated from one another, while all are of small size. The skull presents points of resemblance both to the hyæna and the mungoose, and there seems little doubt that its ancestor was some civet-like creature from which the hyæna also sprung, but that, arising from the direct action of changed conditions and the disuse of certain parts, arrested development, carried almost to the point of reversion, has occurred, with the singular result now under consideration. The Aard-Wolf feeds upon carrion and white ants.

REEDBUCK (*Cervicapra arundinum*).

Family HYÆNIDÆ.—Of the true Hyænas we have the great Spotted Hyæna (*H. crocuta*) and the Brown Hyæna (*H. brunnea*). The latter I have never met with in a wild state, even in those parts of the country into which its range extends. I am unable to speak authoritatively upon the subject, but consider that the areas in which it is to be found are the Lichtenburg and Marico districts, and that it probably seldom ranges east of 28° E. Long. The Spotted Hyæna, locally styled "wolf," is common in all the bush country to the north-west, north, and north-east of the Transvaal, and bears an evil reputation for cowardly cunning and destructiveness. This animal is specially interesting to zoologists on account of the peculiar structural features of the generative organs, which have given rise to the popular belief in hermaphroditism in connection with these creatures. The existing forms of hyænas have 34 teeth, $\frac{3}{3}$ being incisors, $\frac{1}{1}$ canines, $\frac{4}{3}$ premolars, and $\frac{1}{1}$ molars on either side of the jaws. Thus it will be seen that in the upper jaw there is but one tooth behind the carnassial, and in the lower jaw the carnassial forms the last of the series. The premolars have tall and nearly conical crowns, and are strengthened at the base by small longitudinal processes, thus forming crushing instruments of tremendous power. No carnivorous animal has jaws which for strength and crushing power can be compared to those of a hyæna. It may be noticed here that in the lower portion of the Pliocene formation an interesting type of civet has been discovered, called the *Ictithere*, which by its structure proves conclusively that the two families *Viverridæ* and *Hyænidæ* are far more closely allied than might be supposed from the existing living forms.

Division : CYNOIDÆA.

The family *Canidæ* is represented in this Colony by two genera, *Canis* and *Lycaon*, the former embracing the Jackals—the common Red, the beautiful Silver Jackal, or Fennec, and the Black-backed Jackal (*Canis mesomelas*). It is widely distributed across South Africa, but is never found at such high elevations as the common species. I have elsewhere stated that the Asse Fox (*C. chama*) is not found in the Colony, but should modify this by stating that I have seen skins which were said to have come from the neighbourhood of Schweizer-reneke, though I have always understood that its range did not extend north or east of Kimberley.

This curious Hunting Dog (*Lycaon pictus*), the Wild Dog and "Wilde Hond" of the colonists, differs from other members of the *Canidæ* in having

but four toes on each foot, and in its diversified colouration. These creatures hunt in parties of from four to five in number to packs of twenty or

DUIKER (*Cephalophus grimmi*).
Photo by L. T. GRIFFIN, Pretoria.

thirty. They are the most destructive of all the African carnivora, and are consequently looked upon with intense distrust and hatred by the colonists, as in districts where game is scarce they levy a heavy toll upon the farmers' flocks and herds. Nevertheless, they are real sporting creatures, running down their prey in fair chase, and scarcely anything is too big or too strong for them to tackle. The females bring forth their young in holes in the ground. Under the present Government Game Reserves scheme the Hunting Dog is rapidly increasing in numbers, and extending its range over portions of the country from which it had been driven out years ago. I am not aware that the range of the remarkable Lalande's Dog (*Otocyon megalotis*) extends anywhere into the Transvaal.

Division : ARCTOIDÆ.

Family MUSTILIDÆ. — Sub-family MUSTELINÆ. — Embraces the weasels and pole-cats. The species are numerous in the Transvaal, but space will not admit of more than a passing reference to the singular Ratel or South African Honey-badger (*Mellivora ratel*). They are commonly found in wooded kloofs, dwelling in burrows amongst the tree roots, or in hollows in the trees. They are omnivorous, devouring flesh, eggs, honey, insects, and vegetables; in fact nothing comes amiss to them. They are ugly customers to tackle, as they fight savagely and can inflict terrible wounds with their teeth; on the other hand, however, they are easily tamed, and are very susceptible to kindness. They differ very little in any respect from the Indian form. The African Polecat (*Ictonyx*) is perhaps too well known; it is locally styled "Muishond" (mouse dog), and, though really a very pretty little beast, its smell is—well, "drefful."

Sub-family LUTRINÆ. — The Otters (*Lutra*) are represented by one species, *Lutra capensis*, common in all the rivers.

Order : RHODENTIA.

Sub-Order : SIMPLICIDENTATA.

Divison : SCIUROMORPHA.

Family SCIURIDÆ (SQUIRRELS). — Except from a purely scientific point of view, there is nothing very remarkable about the rodents of the Transvaal, an order which is somewhat numerously represented. The family *Sciuridæ* embraces species of the beautiful *Xerus* squirrels, and of the genus *Funisciurus*.

Division : MYOMORPHA.

Family GLIRIDÆ (DORMICE).— This group contains several representative species of *Graphiurus*.

Family MURIDÆ (Rats, mice, and Gerbilles). — **Sub-family MURINÆ.** —Includes species of *Mus* (4), *Arvicanthis*—the pretty little striped Barbary mouse—(2), *Aeomys* (2), *Dasymys* (1), *Saccostomus* (1), and *Golunda* (1).

Sub-family OTOMYINÆ.—Represented by two species of *Otomys*.

Sub-family DONDROMYINÆ.—Includes several species of the genera *Dondromys*, *Steatomys*, and *Limacomys*.

Sub-family GERBILLINÆ. — Is represented by the genus *Gerbillus*.

Family BATHYERGIDÆ.— Represented by two species of *Georychus* (Mole Rat).

Division : HYSTRICOMORPHA

Includes the Families *Octodontidæ*, *Hystricidæ*, and *Pedetidæ*.

Family PEDETIDÆ. — Represented by *Pedetes caffer*.

Family OCTODONTIDÆ.—Represented by the very singular rodent *Thyranomys swinderianus*, known locally as the Cane Rat, and to the Dutch as "Riet-Muis" (reed mouse). It is very plentiful along the banks of the streams in the Middle and Low Veld, where it shelters amongst the scrub and reeds. The flesh is extremely tender, and of delicious flavour, and the animals should be worth domesticating for table purposes.

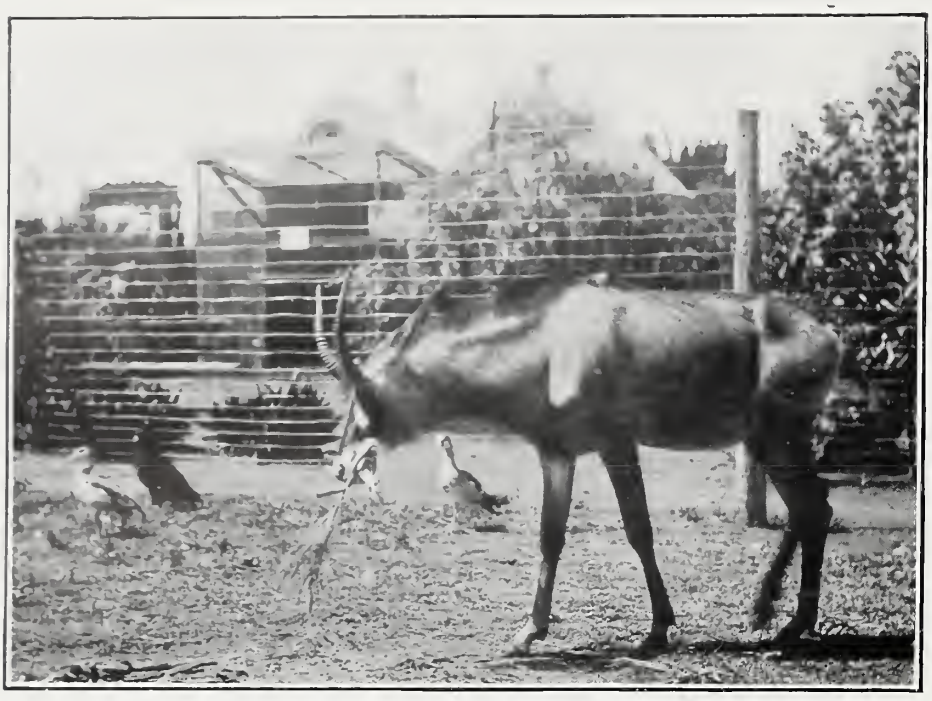
SPRINGBUCK (*Antidoreas euchore*).
Photo by L. T. GRIFFIN, Pretoria.

Family HYSTRICIDÆ.—The porcupine is an animal of common occurrence. Singularly enough, it is often killed and devoured by lions, usually by old animals, with the result that the face and pads become stuck full of quill-points, and I have seen a lioness which had become totally blind from this cause. The common African form is *Hystrix africæ-australis*.

SABLE ANTELOPE
(*Hippotragus niger*).

Sub-Order : DUPLICIDENTATA.

Family LEPORIDÆ. Represented by three species of the genus *Lepus*—*L. capensis* (the Cape Hare), *L. saxitilis* (the Rock Hare), and *L. crassicandatus* (the Red Hare).



ROAN ANTELOPE (*Hippotragus equinus*).

Order : UNGULATA.

The Ungulates, as elsewhere in tropical and sub-tropical Africa, are very numerously represented in this Colony.

Sub-Order : HYRACOIDEA (HYRACES).

Family PROCAVIIDÆ.—Has but a single representative family, genus, and species, the latter being the common form, *Procavia capensis*. They are called "rock rabbits" by the colonists, and are the South African representative of the Scriptural "coney."

Sub-Order : PROBOSCIDEA.

Family ELEPHANTIDÆ. — The Elephant, sole representative of this sub-order, has now become practically extinct in the Colony, though it is reported that three or four from the adjoining territory have wandered into the north-eastern corner of the Game Reserve.

Sub-Order : PERISSODACTYLA, or odd-toed hoofed mammals (which may be recognised by the fact that the toes which correspond to the middle finger and toe of human beings are, in these mammals, symmetrical in themselves and larger than either of the others; sometimes these toes are the only ones present) include in this country two families, *Rhinocerotidæ* and *Equidæ* (the Striped Horses).

Family RHINOCEROTIDÆ. — Twelve years ago the Black, or prehensile-lipped Rhinoceros (*R. bicornis*) was fairly plentiful in the Barberton, Lydenburg, and Zoutpansberg districts, but at the present day, with the exception of a solitary specimen in the Game Reserve, no Rhinoceros exists in the Transvaal.

Family EQUIDÆ. — Representative of the Striped Horses, we have the one species (*Equus burchelli*). *E. burchelli typicus*, possessing the peculiar markings characteristic of the type form procured by Dr. Burchell, was probably never constant, and with equal probability is now extinct. The present existing form has been styled *E. burchelli var. chapmani*, and is known locally though erroneously as the Quagga.

Sub-Order : ARTIODACTYLA.

Even-toed, hoofed mammals, distinguished by the circumstance that the toes corresponding with the human third and fourth fingers and toes are symmetrical to a line drawn between them and are larger than any others, when such are present. The ruminants, and pigs, with their cloven hoofs, represent the highest development of the type. In the case of the Giraffe, only the two middle hoofs remain, but in the Bovidæ the small lateral ones are also retained.

The sub-order is divided into four groups:—the *Bovidæ* (hollow-horned ruminants), the *Giraffidæ* (Giraffes), the *Hippopotamidæ* (Hippopotami), and the *Suidæ* (Pigs).

Division : PECORA.

Family BOVIDÆ.—Includes eight families, seventeen genera, and twenty-three species, which are indigenous.

Sub-family BUBALINÆ.—Genus *Bubalis*.—The Cape or Red Hartebeeste (*Bubalis cama*) is now very scarce, if not altogether extinct, in the western portions of the Colony, where once its range extended.

Genus *Damaliscus*.—These antelopes are very closely allied to those of the former genus. We have in this Colony two species—*Damaliscus albifrons* (the Blesbuck) and *Damaliscus lunatus* (the Tsessebe, or Sassaby). The former is only found now on a few High Veld farms, where it is strictly preserved. The latter is fairly numerous throughout the Bush Veld.

BUSHBUCK (*Tragelaphus sylvaticus*).
Horns, 16 inches.

Genus *Connochætes.* — The Gnus, or Wildebeeste, as they are commonly styled in this country, are singular, grotesque-looking creatures. The group is one which has always presented difficulties in the way of classification. It is evidently a highly specialised one, yet retains many primitive characteristics. The female has four *mammæ*, whereas the hartebeestes have but two. There can be no doubt that the Gnus have been evolved from some primitive form that had ringed horns, as traces of the rings may be discovered on the horns of existing species. We have two species in the Colony, the White-Tailed Gnu, or Black Wildebeeste (*Connochætes gnu*), now only to be met with on the preserved High Veld farms, and *Connochætes taurinus*, the Brindled Gnu, or Blue Wildebeeste. These latter are confined to the bush-clad Low Country.

Sub-family CEPHALOPHINÆ. **Genus** *Cephalophus.* — Represented by two species—the common duiker (*Cephalophus grimmi*), and the Red Bush Duiker (*C. natalensis*). The former is plentiful, and will be found in almost any sort of country except dense bush, whereas the Red Duiker never leaves the vicinity of the latter.

Sub-family NEOTRAGINÆ. — **Genus** *Oretragus.* — Represented by the Klipspringer (*O. saltator*), partial to hilly country and krantzes, but also found amongst the low stony kopjes of the Bush Veld.

Genus *Oribia.*—Species *Oribia scoparia*, the common Oribi. Found on open grass and table lands.

Genus *Raphicerus.* — Two species —*R. campestris*, the Steinbuck, found only in more or less wooded localities, and *R. Melanotis*, the Grysbuck or Gryssteinbuck, which ranges at higher elevations than the former. These antelopes differ from the Oribis in the absence of the naked patch below the ear, and in the absence of lateral hoofs.

Sub-family CERVICAPRINÆ. — **Genus** *Cobus.*—Represented by the handsome Waterbuck (*C. ellipsiprymnus*), an inhabitant of the thick bush country, and never found at a great distance from water.

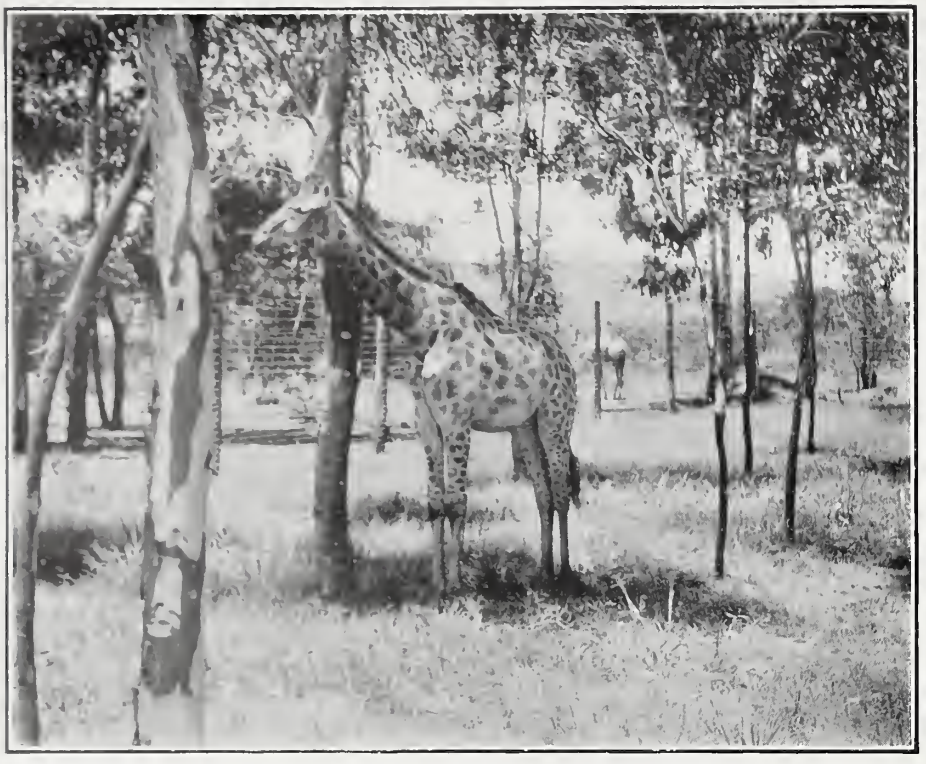
Genus *Cervicapra*, with two species, the Reedbuck (*C. Arundinum*) and the Mountain Reedbuck (*C. fulvorufula*). The former is partial to open and sparsely wooded country, and derives its popular name from its partiality to dense beds of reeds, where it lies during the day. They will, however, as frequently lie up in patches of ferns or long grass, distant from water. Their call is a sharp shrill whistle. The Mountain Reedbuck, as its name denotes, is partial to hilly country, particularly to the upper slopes of the ranges, where it lies up amongst the patches of sugar bush (*Protea*). The name given to it by the colonists is Rooi (*i.e.*, "red") Rhebuck. A local variety of this Reedbuck was discovered by the writer in 1896 in the Lydenburg district, and named by him *C. fulvorufula subalbina*. Several specimens of different ages were secured, and the type specimen is now in the British Museum (see "Proceedings Zoological Society," Nov. 30, 1897).

Genus *Pelea.*—The Rhebuck (*P. capreola*) is the sole representative of this genus. It is common throughout all the hilly, mountainous parts of the country.

Sub-family ANTILOPINÆ. — This group differs from most of those preceding in its very much wider distribution. A well-marked characteristic is the possession of a hairy muzzle. The females have two mammæ (with the exception of one Asiatic species).

Genus *Epyceros.* — Species Impala (*E. melampus*), locally known as the "Rooibok." A beautiful animal with lyrate horns, only found in dense bush country and close to water.

AFRICAN BUFFALO (*Bos caffer*).



YOUNG GIRAFFE (*Giraffa camelopardalis*).

Genus *Antidorcas.* — Species, the Springbuck (*A. euchore*). It differs from the true gazelle in having only five instead of six cheek teeth on each side of the lower jaw.

Sub-family HIPPOTRAGINÆ. —**Genus** *Hippotragus* — Represented by two species, the Sable Antelope (*H. niger*) and the Roan Antelope (*H. equinus*). The now extinct Blaauwbok (*H. leucophœus*) also belongs to this group. The Sable Antelope is partial to high, open downs, but it has been quite exterminated wherever it formerly ranged over such country in this Colony, and has now become as bush-loving an antelope as the Brindled Gnu. The magnificent Roan Antelope is nearly extinct in the Transvaal. It was never so numerous as the sable, and it has generally been observed that wherever the latter is found, its congener, the Roan Antelope, is scarce, if not altogether absent. There is no doubt that the Sable Antelope is obtaining the mastery in the struggle for existence, and the Roan is a gradually disappearing form.

Sub-family TRAGELAPHINÆ. —**Genus** *Taurotragus.* — The Eland (*T. oryx*) is now almost, if not quite, extinct in the Transvaal, but two years before the war I came across a small lot of five, a bull and four cows, just north of the Oliphant's River, and these were seen in about the same place twelve months later.

Genus *Strepsiceros.* — Represented by one species, the Kudu (*S. kudu*). Their numbers were sadly diminished during the rinderpest, but there are still a good number in the Game Reserves, and along the lower western foot-hills of the Drakensberg.

Genus *Tragelaphus.* — The Bush-buck of the Transvaal (*T. scriptus sylvaticus*) is still common in most wooded localities, its favourite haunts being the roeky, wooded kloofs of the middle and upper Low Veld. In the Transvaal the bushbuck are seldom found far from water, whereas in the Cape Colony they often live in the midde of vast waterless traets of bush, and infrequently visit the streams.

Sub-family BOVINÆ.—Only represented by one species of the genus *Bos*. The Cape Buffalo (*Bos caffer*), once very plentiful in the Transvaal, is now exceedingly scarce.

Family GIRAFFIDÆ.—The Giraffe found in the Transvaal has now been accorded its proper place in the classifieation of this group, the result of the labours of Mr. R. Lydekker (P.Z.S., 1904: Vol. I.). This indefatigable naturalist refers the loeal form to one of the ten sub-speeies of *Giraffa camelopardalis* under the title of *G. C. wardi*, the Northern Transvaal Giraffe. The differentiation of these ten sub-specific forms is based not only on colour and markings, but on more important eranial differenees. These latter are very marked as between the Transvaal and any other sub-species.

Unfortunately, want of space forbids further reference to this interesting subject, so I will only remark that as the habitat of the Transvaal Giraffe is quite isolated, it seems likely that this form may be peculiar to the Colony.

Division: SUINA.

Family HIPPOPOTAMIDÆ. — The Hippopotamus (*H. amphibius*) is still fairly plentiful in favourable localities. The two genera of the family *Suidæ* are represented by the species *Potamochœrus africanus* (the Bush-pig) and *Phacchœrus æthiopicus* (the Wart-hog, or Vlak-Vark). The former is nearly allied to the Red River Hog of West Africa. The Wart-hogs, some of the most ungainly-looking animals in the world, are distinguished from the true pigs by the reduetion in the number of the upper ineisors. The young of the Bush-pig are striped, as are the young of nearly all the true pigs. Those of the Wart-hog have no markings.

YOUNG WART-HOG
(*Phacchœrus æthiopicus*).

Order: EDENTATA.

Sub-Order: NOMARTHRA.

Family ORYCTEROPODIDÆ. — Represented by the singular creature known as the Antbear (*Orycteropus æthiopicus*). It is of common occurrence, though its shy, nocturnal habits and burrowing propensities account for the fact that it is very seldom seen. It carries two pre-molars and three molars on each side of each jaw.

Family MANIDÆ. — Represented by one species of the genus *Manis*, the Scaly Ant-eater.

CLASS: *AVES* (BIRDS.)

Our consideration of the extensive Avi-fauna of this Colony must of necessity be even relatively briefer than that of the Mammals, being limited to a glance at the principal species and commoner forms of each family.

Order: PASSERES.

Families PROMEROPIDÆ, NECTARINIIDÆ, ZOSTEROPIDÆ. — This widely-distributed and numerously represented order first claims our attention. Who is there that, having eyes for the beauties of nature, has not admired the gorgeous colouring and sprightly movements of those feathered gems locally styled "Honeysuckers," but correctly known as Sunbirds? They are the African representatives of the humming birds of the New World, which they almost rival in beauty of plumage, whilst some are equally diminutive in size. The *Promeropidæ* are represented by *P. gurneyi*, and the *Nectariniidæ* by the genera *Nectarinia* and *Cinnyris*. The Malachite Sunbird (*N. famosa*), the Amethystine Sunbird (*Cinnyris gutturalis*), and the lovely Scarlet-breasted Sunbird are amongst the most beautiful of the eleven species which form the group in this Colony. Their food consists principally of nectar extracted from flowers, their curved scimitar-shaped bills being peculiarly adapted for probing the petals in search of the hidden sweets. This diet, however, is largely supplemented by insect food, of which they devour great quantities. Their nests are of most beautiful and delicate construction. The *Zosteropidæ* are represented by three species, *Z. pallida*, *Z. virens*, and *Z. capensis*.

Family MOTACILLIDÆ. — The Wag-tails are represented here by seven species of the genus *Motacilla*, amongst them being—*M. vidua*, *M. vaillanti*, *M. melanocephala*, and *M. longicauda*. The first and last of these I have observed in Central Africa. *M. campestris* and *M. flava* are also found within our limits, and the rare *M. f. borealis* is occasionally seen in the Lydenburg district. These birds, being of a most friendly and sociable disposition, and being generally protected by tacit consent of both whites and natives, have almost lost all fear of man, and flit about towns, villages, and kraals with a boldness induced by long immunity from harm. Their habits are migratory, and their song soft and pleasant. We have seven Pipits of the genus *Anthus*, all of more or less migratory habits. The Cape Long Claw (*Macronyx capensis*) and *M. croceus* are also indigenous species.

NEST AND EGGS OF BAKBAKIRI SHRIKE (*Laniarius gutturalis*).

VERREAUX' EAGLE OWL

(*Bubo lacteus*).

Family PARIDÆ.—The Tits are poorly represented by the genera *Parus*, with the species *P. niger* and *P. cinerascens*, and *Ægithalus* with two species, *Æ. capensis* and *Æ. caroli* (the Penduline Tit). The Tits are lively creatures, the embodiment of the idea of perpetual motion, and are fearless and somewhat quarrelsome birds.

Family ALAUDIDÆ.—The eight species of the genus *Mirafra* include *M. apiata*, widely distributed in the Cape Colony, also *M. nigricans*, *M. sabota*, *M. nævia*, *M. fringillaris*, *M. cheniana*, and *M. rufipilea*, *M. nivosa*. The genus *Pyrrhulauda* has three species, and *Ammomanes* one. The Rufous long-billed Lark (*Certhilauda rufula*) is also found within our limits, as well as the following sole representatives of their genera—*Spizocorys conirostris*, *Tephrocorys cinerea*, *Alaemon semitorquata*.

Family FRINGILLIDÆ. — This family comprises a numerous group of birds consisting of the Buntings, Sparrows, and Serin Finches.

Sub-family EMBERIZINÆ.—The Buntings of this sub-family number four species of the genera *Emberiza* and *Fringillaria*. They are pretty birds, the predominating colours of their plumage being black, yellow, and grey, and they have a very pleasing song. They quickly become tame in captivity. The Golden-breasted Bunting (*Emberiza flaviventris*) is of common occurrence, and is one of the prettiest of the group. The Cape Bunting (*F. capensis*) with *F. tahapisi*, and the Lark Bunting (*F. impetnani*) complete the representative species.

Sub-family FRINGILLINÆ. — The African Serin or Canary Finches are members of the genus *Serinus*, and comprise eight indigenous species. The Black-throated Serin Finch (*S. angolensis*) and the golden-rumped Serin Finch (*S. flaviventris*) are characteristic forms, the remaining species being *canicollis*, *ieterus*, *scotops*, *sulphuratus*, *rendalli*, and *imberbis*. The Transvaal has, of course, a sparrow, the African Grey-headed variety (*Passer diffusus*), which is widely distributed over the southern continent. The other species of this genus are *motitensis* and *arcuatus*. The Yellow-throated Sparrow (*Petronia petronella*) is another widely-distributed form which I have also collected from Central Africa. The Striped-headed Grosbeak (*Poliospiza gularis*) also belongs to this group, and is indigenous.

SPOTTED EAGLE OWL
(*Bubo maculosus*).

Family PLOCEIDÆ.—This family, which embraces the Weavers, Wax-bills, and Widow or Whydah birds, is a very large and interesting one. It is represented in this Colony by some twenty-one genera and about forty species.

Sub-family PLOCEINÆ. — The most important genera of this sub-family are *Hyphantornis*, the Black-headed and Black-fronted Weaver Finches, with seven representative species, and *Sitagra*, the more common and less striking olive and yellow Weaver Finches. Other species are *Texto niger*, *Anaplectes rubriceps*, *Amblyospiza albifrons*, *Ploceipasser mahali*, and *Sporopipes squamifrons*.

Sub-family ESTRILDINÆ.—Represented by two species of *Pytelia*, two of *Laganosticta*, five of the genus *Estrilda*, one Hooded Weaver of the genus *Spermestes*, also the Bar-breasted Weaver—*Ortygospiza polyzona*, *Amadina erythrocephala*, and *Philetærus socius*, the well-known Sociable Weavers. The tiny Wax-bills of the genera *Laganosticta* and *Estrilda* are most dainty and exquisitely coloured creatures, and some of them are very little larger than humming birds. The Ruddy Wax-bill (*Laganostieta rubricata*) and the Blue-throated Wax-bill (*Estrilda angolensis*) are perhaps the most charming of the group.

AFRICAN GROUND HORNBILL. (*Bucorvus caffer*).

Sub-family VIDUINÆ.—*Quelea* is represented by but one species, and *Pyromelana* by three. The latter include the beautiful fiery-plumaged Bishop Birds, which are remarkable for their colouration even in a land of gorgeously-coloured bird life. Two of the most striking forms are the Scarlet (*P. oryx sundevalli*) and the Taha Bishop Bird (*P. taha*). The common Whydah Finch or Widow Bird (*Vidua principalis* and *V. paradisea*) are the best-known forms of this remarkable group. Other representatives belong to the genera *Hypochera*, *Urobrachya*, and *Coliopasser*. They are all really beautiful birds, particularly the Red-shouldered *U. axillaris* and the Red-collared species *C. ardens*. They are remarkable for the extraordinary development of the tail feathers of the male birds during the summer months. Their striking plumage of deepest jet and glowing orange, and their lively movements, add greatly to the charm of a country ramble. The hen birds are very soberly clad, and each male bird supports a harem of anything up to twenty hens. It is very amusing to

watch the manner in which the latter, darting hither and thither, teasing the male bird to the top of their bent, always elude his attempt to catch them, overweighted as he is by his heavy plumes. Every member of the family is addicted to plundering the farmer's grain, and so persistent are they in their efforts that they become serious pests in the fields of ripening corn.

Family ORIOLIDÆ. — We have three indigenous Orioles (*Oriolus notatus*), *O. galbula*, and the commoner Black-headed Oriole (*O. larvatus*). They are somewhat "rough" on fruit in the autumn, and on this account, and for the sake of their beautiful plumage, are subjected to most undeserved persecution. They are, however, such persistent destroyers of insects that few birds better deserve protection.

Family STURNIDÆ.—Sub-family STURNINÆ. — Coming now to the Starlings, we find a group which includes many of the most strikingly beautiful birds of South Africa. These are the Glossy Starlings belonging to the genera *Amydrus*, *Lamprocolius*, *Lamprotornis*, and *Pholidauges*. The plumage of these lovely birds almost surpasses description, glowing as it does with iridescent bronze, deepest ultramarine, emerald green, and richest purple. The genus *Lamprocolius* includes four species, amongst them Peters' Glossy Starling (*L. syeobius*), perhaps the most beautiful of the group. To this family also belong the singular Wattled Starling (*Dilophus caruculatus*), and the common Spreo (*Spreo bicolor*).

Sub-family BUPHAGINÆ.—This includes the Red-billed (*Buphaga erythrorhyncha*) and the Yellow-billed Oxpecker (*B. africana*). The former in the vernacular are styled "rhinoceros birds," it being their mission on earth to rid the bodies of rhinoceros, buffalo, and all the larger herbivora, from the parasitic ticks which infest them. Being remarkably wide-awake creatures, it becomes a very difficult matter to stalk a head of game which is attended by them, as immediately any strange object approaches, the latter fly up with harsh, warning cries, the meaning of which is thoroughly understood by the game. In the Low Veld these birds perform the same office for horses, cattle, and donkeys, and by persistently pecking at the spot where the ticks have bitten cause very ugly sores which are extremely reluctant to heal.

Family CORVIDÆ.—Three species of the *Corvidæ* are found in the Transvaal—the Great White-Necked Raven (*Corvultur albicollis*), the Black-and-White Crow (*Corvus scapulatus*), and the South African Rook (*Heterocorax capensis*). The Great Raven is a fierce and destructive bird, carrying off young poultry, destroying large quantities of young game, and pilfering eggs.

Family LANIIDÆ.—Sub-family PRIONOPINÆ. — The Shrikes are well represented, more particularly in the Lydenburg and Barberton districts. There are three species of *Lanius*, one

NEST AND EGGS OF NAMAQUA SAND GROUSE (*Pterocles namaqua*).

of *Urolestes*, one of *Eurocephalus*, one of *Nilaus*, three of *Telephonus*, two of *Dryoscopus*, four of *Laniarius*, one of *Sigmodus*, and one of *Prionops*. Of the singular Helmet Shrikes we have three species—*Sigmodus tricolor*, and *Prionops talaeoma* (the South African Helmet Shrike).

Sub-family MALACONOTINÆ. — The Bush Shrikes are well represented, especially in the Lydenburg district, three species being found there which I have not met with elsewhere, though they have been observed in the wooded tracts of the Barberton district. These are the Three-streaked Bush Shrike (*Telephonus australis*, vel *trivirgatus*), the greater Puff-back Bush Shrike (*Dryoscopus ferrugineus*) and *Laniarius sulphureipectus*. I believe that *T. tchagra* has also been observed near Lydenburg. *Dryoscopus cubla*, the Lesser Puff-back, is quite a common form. The name Puff-back has been given to these birds on account of the mass of soft erectile feathers on the back. These are so delicate that it is difficult to secure an undamaged specimen unless a small collector's gun is used.

The genus *Laniarius* includes some of the most brilliantly-coloured members of the family. Conspicuous amongst them is *L. atrococcineus*, the splendid Crimson-breasted Bush Shrike. The Bakbakiri Bush Shrike (*L. gutturalis*) is an old familiar friend, with his loud and pleasing note, inquisitive habits, and beautiful plumage. The name Bakbakiri gives fancied expression to the call of these birds. Hidden in a thicket, the male bird calls "Bakbakiri," and is immediately echoed by its mate, "Ki-ri." Personally I could never detect any resemblance to these syllables, but the name has become a familiar one. In the spring time the male frequently

indulges in a short but loud, full-throated song. The other representative species are the Great Grey-headed Bush Shrike (*L. poliocephalus*), the Yellow-breasted Bush Shrike (*L. sulphureipectus*), and *L. rubiginosus*, all of which are to be found in the Lydenburg district.

All the members of this most useful family are good friends of the farmer, destroying enormous numbers of caterpillars, locusts, and other insects, while even mice, frogs, and lizards fall prey to their voracity. Unfortunately both young nestlings and birds' eggs also figure upon their menu.

SOUTHERN OSTRICH (*Struthio australis*).

Sub-family LANIINÆ. — This embraces the typical Shrikes, and includes the well-known South African Long-tailed Shrike (*Urolestes melanoleucus*) and four species of the genus *Lanius*—*L. collaris*, the common and widely-distributed Fiskal Shrike, the Lesser Grey Shrike (*L. minor*), *L. subcoronatus*, and the Red-backed Shrike (*L. collurio*). *Eurocephalus anguitimens* and *Nilaus capensis* (brubru) are other representative forms.

Family CRATEROPODIDÆ.—This family embraces the Babblers, or as they are often called the Babbling Thrushes, and the Bulbuls.

Sub-family CRATEROPOPINÆ.—Represented by one genus, *Cratero-pus*, with two species, *C. jardinii* (Jardine's Babbler) and *C. bicolor*. I think it is possible that *C. kirki*, which occurs in Rhodesia, may also range within our limits.

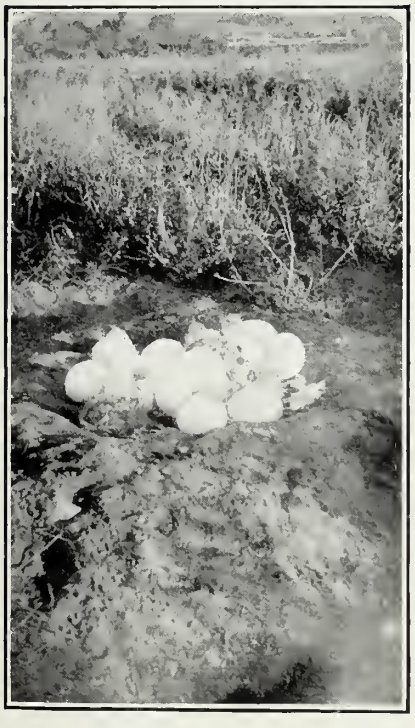
Sub-family BRACHYPODINÆ.—Amongst the Bulbuls we have some rather pleasing songsters. The group is a very useful one in many respects, as they destroy great numbers of insect pests, but it must be confessed that in the fruit season they are so very destructive to ripe fruit that one is apt to lose sight of the good they do at other times. The family is a very large one, and numerously represented both in India and Africa. One of the best-known species in this country is Layard's Bulbul (*Pycnonotus layardi*), a very handsome bird, and also of frequent occurrence in Central Africa. Other species are *P. nigricans*, from Lydenburg district, the Sombre Bulbul (*Andropadus importunus*), *Chlorocichla flaviventris*, and two species of *Phyllostrophus*—the Bristle-necked Bulbul (*P. capensis*), and *P. flavistriatus*. The latter I have only met with on the Sabi River, Lydenburg district.

Sub-family BRACHYPTERIGINÆ.—Represented solely by *Parisoma subcærulcum*. The Bulbuls, I may state here, are partially migratory in their habits.

Family TURDIDÆ.—This group, consisting of the Thrushes, Ground Thrushes, Wheatears, Chats, and Robins, is numerously represented, the indigenous forms being referable to ten genera and twenty-six species. Amongst them are several sweet songsters. Of the true thrushes we have the South African Ground-scraper Thrush (*Turdus litsipsirupa*), the rare *T. gurneyi*, *T. cabanisi*, *T. olivaceus*, and the Kurrichane Thrush (*T. libonianus*). The Rock Thrushes of the genus *Monticola* include two most elegantly-coloured birds—the Cape Rock Thrush (*M. rupestris*), and the still more handsome Sentinel Thrush (*M. explorator*). This latter is of frequent occurrence in the mining district of Pilgrim's Rest and about Barberton. The singular and rare *M. brevipes* is found on the Drakensberg range, usually at high altitudes. It is distinguishable by its white eyebrows. The genus *Myrmecocichla* includes two representative species—*M. formicivora* (the Ant-eating Chat) and *M. bifasciata* (the Buff-streaked Chat). *Pratincola torquata*, the handsome South African Stone-Chat, and *Saxicola mouticola* (the Mountain Chat) are of common occurrence. The latter genus is also represented by *S. pileata* (the Capped Wheatear), and *S. familiaris*. The Sickle-winged Chat (*Emarginata sinuata*) is somewhat rare. The White-shouldered Bushchat (*Thamnolæa cinnamomeiventris*) is a widely-distributed

form, but its congener *T. arnotti* I have only met with in the Lydenburg district, though I believe it is common in Rhodesia. The genus *Cossypha* numbers five species—*C. bicolor*, *C. natalensis*, *C. caffra* (the Cape Robin), *C. heuglini*, and *C. humeralis*. Of these, *bicolor* and *heuglini* are probably confined to the bush-clad areas of the Lydenburg and Waterberg districts. The pretty little White-starred Bush Robin (*Tarsiger stellatus*), and *T. silens*, are representative forms. The ground robins (*Erythropygia*) include *E. paena*, *E. quadrivirgata*, and *E. pectoralis*.

Family SILVIIDÆ.—This is another numerously-represented family, and also includes many birds of sweet song, the Warblers and Bush-Warblers. They are referable to fifteen genera and from thirty to thirty-five species. This group and those of the *Hirundinidæ* (Swallows) and *Muscicapidæ* (Fly-catchers) are unquestionably the most useful birds we have in the country, the number of injurious insects destroyed by them being almost incredible. Four well-known European forms are summer migrants in this country—the Garden Warbler (*Sylvia hortensis*), the Sedge Warbler (*Acrocephalus schœnobœnus*), the Willow Wren (*Phylloscophus trochilus*), and the Greater Reed Warbler (*Acrocephalus arundinaceus*). *Acrocephalus* has also another representative species (*A. bæticus*), found also in Rhodesia and Natal. We have three species of *Bradypetrus*, one of



OSTRICH CHICKS HATCHING OUT.

which—*B. barratti*—is perhaps peculiar to the Lydenburg district. The Stripe-throated Reed Warbler (*B. brachypterus*) and *B. barbæcula* are other indigenous species. *Erimomela scotops* is fairly common in the Lydenburg district. *E. usticollis* is the common and widely-distributed form. *E. flaviventris* (the Yellow-bellied Bush Warbler), and *E. polioxantha* are other members of the genus. The exquisite little Green-backed Bush Warbler (*Camaroptera olivacea*) I have collected also in the Cape and in Central Africa. Sundevall's Bush Warbler (*C. sundevalli*) is also within our limits. It has a soft, pleasing song. *Sylviella rufescens* and *Cryptolopha ruficapilla*, the Short-tailed and the Tawny-headed Bush Warblers, further represent this large family. The genus *Apalis* numbers in the Transvaal two species—*A. thoracica*, and the delicate little *A. scita*, the Fairy Warbler. The Black-breasted Warbler (*Chlorodyta neglecta*) and the Barred-breasted Wren Warbler (*Calamonastes fasciolatus*) have been observed in the Lydenburg district. The Wren Warblers of the genus *Prinia* are referable to three species, including the Black-shouldered Wren Warbler (*P. flavicans*), and the Grass Warblers of the genus *Cisticola* to five species. Amongst these are the diminutive Tink-tink (*C. terrestris*) and the somewhat rare *C. aberrans*. The Rufous-eared Wren Warbler (*Spiloptila ocularia* and *Sphenœacus natalensis*) conclude our survey of this interesting group.

Family MUSCICAPIDÆ. — The Fly-catchers are represented in this Colony by nine genera and thirteen species. These birds are wonderfully quick and lively in their movements, and as a rule take their insect prey on the wing, very seldom alighting upon the ground. Like the Warblers, they are migratory. They have no song, and always appear far too busy to indulge in such frivolity. More or less partial to the bush-clad areas of the Lydenburg district are the Bush Black Cap (*Lioptilus nigricapillus*), *Bradyornis ater*, and *B. murinus*. Other representatives within our limits are *B. mariquensis*, *Alseonax adusta*, and *Chloropeta natalensis*. The genus *Pachyprora* has two species—*P. capensis* and *P. molitor*. Two delicate and extremely beautiful birds are the Blue-mantled Flycatcher (*Trochocercus cyanomelas*), and the South African Paradise Flycatcher (*Tersiphone perspicillata*). The latter is indeed a lovely little creature, especially in the summer months, when its long tail feathers are fully developed. As is the case with most migrants, one meets with this bird in all parts of the country suitable to its habits, from the Cape to the Central African Lakes. The Drongos of the genus *Dicrurus* include the

WATTLED CRANE (*Bugeranus carunculatus*) and STANLEY CRANE (*Grus paradisea*).

Fork-tailed (*D. afer*) and the Square-tailed Drongo (*D. ludwigi*). The former is a most active enemy to insects, and commands attention by its funereal plumage, its lightning-like swoops upon its winged prey, and its harsh cries. Amongst other insects it has a great partiality for honey bees, a fact which has brought it into evil repute. It is stated that at times this bird indulges in quite a passable song, but I have never heard it.

Family CAMPOPHAGIDÆ.—This family embraces the singular Cuckoo Shrikes, as they are termed, and is represented by four species — *Campophaga nigra*, *C. hartlaubi*, *Graucalus cæsius*, and *G. pectoralis*. Of these *C. hartlaubi* and *G. pectoralis* (Jardine's Cuckoo Shrike) are of somewhat rare occurrence. The latter bird I have frequently collected from Central Africa. The handsome Black Cuckoo Shrike (*C. niger*) is a very common form in the Cape Colony, but less so in the Transvaal, and *C. hartlaubi* I have only once seen in the Transvaal in the Lydenburg district. The female bird is beautifully plumaged, and bears a striking resemblance to the hen Golden Cuckoo (*Chrysococcyx cupreus*), but is slightly larger. I have seldom seen any of these birds take their prey on the wing, though *C. niger* can occasionally be seen thus occupied. They usually dart about

amongst the branches of the trees, and thus make what captures they can. Their flight is swift and cuckoo-like.

Family HIRUNDINIDÆ.—Represented by three species of Cotile, one of *Chelidon* and one of *Ptyonoprogne* (the Martens and Sand Martens), and seven Swallows of the genus *Hirundo* and one of *Psalidoprocne* (the Black rough-winged Swallow). The Fawn-breasted Marten (*Ptyonoprogne fuliginula*) appears to remain in this country throughout the year, as also does *Cotile paludicola*. *C. cincta* (the Collared Sand Marten), however, is a migrant. The dear friend of childhood's days in the home land, the Chimney Swallow (*H. rustica*), is a regular visitant to this country, bearing with it each year silent messages from the "stately homes of England" as well as from her "cottage homes" to her sons and daughters in far-off South Africa. The beautiful Red-breasted Swallow (*Hirundo semirufa*) is easily distinguished by its brilliant green and blue-black plumage on head and back, and rich rufous under parts. *H. cucullata* and *H. puella* (the Greater and Lesser Striped-breasted Swallows) are periodical visitants. It is somewhat singular that these migrants from the north appear to *pass over* Rhodesia, Bechuanaland, and the Transvaal, and go first to the Cape Colony, where a certain number take up their residence, and others *return* to the northern Colonies, settling in these from a month to six weeks later.

Order: PICARIÆ.

Sub-Order: ZYGODACTYLA.

The great order of Picarian birds, many of which have seriously puzzled modern ornithologists to decide upon their affinities, now claims our attention. The Transvaal—owing to the very large area of its surface which is without bush of any description, to say nothing of forests—is not as rich in types of bird life which frequent such wooded localities as is the Cape Colony. Nearly all the existing representative forms are therefore confined to the bush veld on the north and north-eastern borders.

Family PICIDÆ. — Sub-family PICINÆ.—The Woodpeckers in our Colony are referable to five or at most six species belonging to the genera *Campothera*, *Dendropicus*, and *Geocolaptes*. The Ground Woodpecker (*Geocolaptes olivaceus*) is the only representative of its genus, and is found in the areas above alluded to. The exquisite little Golden-tailed Woodpecker (*Campothera abingdoni*), and the equally beautiful Cardinal Woodpecker (*Dendropicus cardinalis*) are found in the Colony, also *C. bennetti* and *C. smithii*. The Grey-headed Woodpecker (*Mesopicus griseocephalus*) is also a resident form. The Bearded Woodpecker (*Thripias namaquus*) is likewise found in the Transvaal.

Sub-family INNGINÆ.—I have only met with one Wryneck in the Transvaal, the Red-breasted variety (*Iynx ruficollis*), which I secured on the Crocodile River, near the Portuguese border.

Family CAPITONIDÆ.—The Barbets are represented by the Pied (*Tricolhæma leucomelas*), the Black-collared (*Lybius torquatus*), and Le Vaillant's Barbet (*Trachyphonus caffer*). The Pied Barbet eats fruit and seeds, and its far-sounding, ringing notes may be heard throughout the day, though particularly in the early morning. Other resident forms are the White-eared (*Stactolæma leucotis*) and the White-browed Barbet (*Barbatula bilineata*), and Exton's Tinker Bird (*B. extoni*).

Family CUCULIDÆ. — Sub-family INDICATORINÆ.—The interesting little Honey Guides are represented by four species—the White-eared (*Indicator indicator*), the Greater (*Indicator major*), the Sealy-throated (*I. variegatus*), and the Lesser Honey Guide (*I. minor*). Their habits are very cuckoo-like, even to the depositing of their eggs in the nests of other birds.

Sub-family CUCULINÆ. — Represented by the genera *Cuculus*, *Coccystes*, and *Chrysococcyx* (Golden Cuckoos). The European Cuckoo (*Cuculus canorus*) is an exceptionally rare migrant. Specimens have been secured at Potchefstroom, and the writer himself has shot, near Lydenburg, the only specimen he has ever seen in the country. The black upper mandible is practically the only point of distinction between this bird and *C. gularis*. Another handsome member of the group is the Noisy Cuckoo (*C. clamosus*), one of the wariest of birds, and extremely difficult to bring to bag. I have often been compelled to stalk them with as much care as if a head of big game had been my objective. These birds invariably select the topmost branches of the highest trees on which to perch, whence they give forth their loud, musical call. In this

BLUE KORHAAN (*Trachelotis cærulescens*).

respect they much resemble the handsome Red-chested Cuckoo (*C. solitarius*). The genus *Coccystes* includes the very widely-distributed Black-and-White Cuckoo (*C. jacobinus*), and the very localised and far more rare Black-and-Grey Cuckoo (*C. hypopinarius*). Like all the cuckoos, their flight is very swift. They are usually found in pairs, and have the true cuckoo notes. The Great Spotted Cuckoo (*C. glandarius*) also occurs in this Colony. The very handsome Black-crested Cuckoo (*C. serratus*) and Le Vaillant's Cuckoo (*C. caffer*) conclude the genus. The Golden Cuckoos (*Chrysococcyx*) include Klaas's Cuckoo (*C. klaasi*) and the Golden Cuckoo (*C. cupreus*). The altogether lovely Emerald Cuckoo (*C. smaragdinus*) does not occur, as far as I am aware.

Sub-family CENTROPINÆ.—Represented by the Lark-Heeled Cuckoo (*Centropus senegalensis*) and the Natal Centropus Cuckoo (*C. nigrorufus*). They are well known by their singular but not unmusical call, which during even the greatest heat of the day resounds through the dense clumps of reeds and bush in which they live. Unlike the true cuckoos their flight is weak and heavy, and never long sustained. *C. natalensis* has, I believe, also been taken in this Colony, and *C. nigrorufus* occurs in the Lydenburg district.

Family MUSCOPHAGIDÆ.—The Turacos, of which the Colony possesses three species, belonging to the genera *Turacus*, *Gallirex*, and *Schizorhis*, form another very indeterminate group of birds, whose habitat is purely African. They appear to be related to the *Gallinaceæ*, somewhat more nearly to the parrots and colies, and still more nearly to the cuckoos. Two of the species common to this Colony are exquisitely beautiful creatures.

The Purple-crested Turaco (*Gallirex porphyrcolophus*) is dark purple-blue, shot with green, the breast grey, and the long pinion feathers of the wings of the most perfect scarlet crimson. The crest is purple. It is a somewhat coarsely-shaped bird, although its colouration is so fine, but the next species, the White-crested Turaco (*Turacus corythaix*) is a really lovely creature, perfect in outline, and even more brilliantly coloured than its congener. The body is a delicate grass green, the crest of the same colour tipped with snowy white, the wing-coverts and tail dark indigo blue, while the long pinions are of the same rich scarlet crimson as in the case of *Gallirex*. To see these winged beauties flitting from tree to tree in the gloom of a silent forest, every now and then passing through a shaft of glowing sunlight that streams down between the trees, is an education in itself. They are fearless birds, and will permit the intruder to approach very closely if he keeps reasonably quiet, and so satisfies them that he intends no harm. Their loud but not unmusical cries can be heard all day long in the forest, as they keep up an incessant communication one with the other.

NEST OF GOLIATH HERON (*Ardea goliath*).
The nest will be seen on the "snag" in the river.

The remaining genus *Schizorhis* is represented by the Grey Turaco (*Schizorhis concolor*). This bird is quite without the gorgeous plumage of *Turacus* and *Gallirex*, being clad from crest to tail in sombre grey, though a dull greenish mark on the breast shows the commencement of the green colouration which is so characteristic of the family. The wing pinions are intensely dark purple. These birds are very common in the wooded portions of the country, being more partial to low-lying plains covered with thin bush than to the higher kloofs and forested uplands. From a sportsman's point of view they are among the most annoying birds in existence, as they are supernaturally quick at "spotting" an intruder, whom they immediately follow, flying from tree to tree and screaming to him all the while (a singularly close imitation of the human voice) to "Go-'way, go 'wa-a-aay"! Needless to say, a successful stalk or approach to a wounded animal is almost an impossibility under these circumstances, the observant game instinctively understanding the meaning of the bird's call.

Family COLIIDÆ.—The Colies or Mouse Birds are an interesting group of Picarians of somewhat doubtful affinities. They are, however, certainly related to the *Cuculidæ* (Cuckoos), and still more nearly to the *Muscophagidæ* (Turacos). A very singular feature in connection with these birds is the arrangement of their toes, which is such that they are able at will to turn one of the three front toes to the back so that they set two and two in zygodactylous form, and also to bring the hind toe to the front in line with the front toes. The wings are short, but strong, and the

flight very rapid and straight. The tail is long and graduated. From their peculiar habit of creeping about amongst the branches of the trees has originated their local name of "mouse birds." They are terribly destructive creatures in an orchard. Our Colony possesses three species, the Quiriva Coly (*Colius erythromelon*), *C. capensis*, and the common form (*C. striatus*).

Family TROGONIDÆ. — Very little would appear to be known of the habits of the group of beautiful birds called Trogons, which is represented, I believe, in this Colony by but one species of but one genus—*Hapaloderma narina* (the Narina Trogon). Even this species is of very infrequent occurrence, though in the Cape Colony and Central Africa they are common enough. They are lovely birds, their soft, silky plumage glittering with most brilliant hues. They are, however, very unsociable, and of most retiring habits. Their food consists principally of insects of all descriptions.

Family CYPSELIDÆ.—I am only aware of two species of Swift in the Transvaal, the common form, *Cypselus africanus* and the African White-rumped Swift (*C. caffer*), which I think is peculiar to the northern portions of the Colony.

Family CAPRIMULGIDÆ.—The Nightjars, or Goatsuckers (*Caprimulgus*), are persistent destroyers of such insects as mosquitoes, moths, beetles, etc. They are thus as useful birds as the swallows and swifts. Four species at least are met with in the Transvaal—*Caprimulgus trimaculatus*, *C. europæus*, *C. rufigena*, and *C. fervidus*, the Fiery-necked Nightjar. I believe that the European form (*C. europæus*) has also been taken in the Colony. They are migratory birds, travelling only through the night. The nails of the two central toes are toothed or notched in a very peculiar manner, and the object of these toothed appendages has been the subject of much speculation.

Family STRIGIDÆ. — Sub-family STRIGINÆ. — Represented by the common Barn Owl (*Strix flammea*) and the African Grass Owl (*Strix capensis*).

Sub-family BUBONINÆ.—That handsome bird, the Spotted Eagle Owl (*Bubo maculosis*), and the magnificent Verreaux' Eagle Owl (*Bubo lacteus*), are the largest indigenous species. *Scops leucotis* (the White-faced Scops Owl), *Asio capensis* (the Short-eared Owl), *Syrnium woodfordi*, *Strix flammea*, and two species of *Glaucidium*—viz., *G. capense* (the Barred Owlet) and the exquisite little *G. perlatum* (Pearl-spotted Owlet)—are other indigenous forms.

NEST AND EGGS OF GOLIATH HERON (close view).

Sub-Order: SYNDACTYLA.

We now arrive at several groups of birds such as the kingfishers, hornbills, hoopoes, rollers, comprising the great sub-order *Syndactyla*, and which are more closely inter-related than the other groups of Picarians. The peculiar feature common to all these groups is the formation of the feet, the third and fourth toes on each foot being united nearly up to the roots of the nails. It has been suggested that this character has been acquired through descent from a zygodactylous ancestor, one of the hind toes having become directed forward, and this I think is a very probable explanation.

Family MEROPIDÆ.—The Bee-eaters, amongst which are many very beautifully-coloured forms, are here represented by some six species. The most striking forms are the European Bee-eater (*Merops apiaster*), the Blue-cheeked Bee-eater (*M. persicus*), and the Crimson-throated Bee-eater (*M. nubicoides*). This latter, with its silken plumage of crimson scarlet, rose-pink, azure blue, blue-green, and black, is unquestionably one of the most beautiful birds in the world. The Little Bee-eater (*Melitthophagus meridionalis*) and the White-fronted Bee-eater (*M. albifrons*) are other Transvaal members of the family. The Swallow-tailed Bee-eater (*Dicrocercus hirundineus*) is also a resident form.

Family CORACIIDÆ.—The Rollers (or Blue Jays, as they are termed in this land of misnomers) are represented by only four species belonging to the genera *Coracias* and *Eurystomus*. The Lilac-breasted Roller (*C. candatus*) is a beautiful bird, its plumage consisting of various shades of blue, green, violet, and lilac. *C. nævia* (the White-naped Roller) is also a handsome bird. *Eurystomus afer* (the Cinnamon Roller) is the only species of this genus. All are swift and high flyers, the distinguishing name of "rollers" being given to them on account of their peculiar rocking, undulating flight. They take their insect prey on the wing, and are only found in wooded localities.

Family ALCEDINIDÆ. — Sub-family ALCEDININÆ.—Including the Great African Kingfisher, we have four species of this sub-family—*Ceryle maxima*, above alluded to; the Half-collared Kingfisher (*Alcedo semitorquatus*), the common Pied Kingfisher (*C. rudis*), and the exquisite little Mala-

chite-crested Kingfisher (*Corythornis cyanostigma*).

Sub-family HALCYONIDÆ.—This includes the Striped Kingfisher (*Halcyon chelicutensis*), the Brown Hooded Kingfisher (*H. albiventris*), *H.*

BLACK-HEADED HERON
(*Butorides atricapilla*).

swainsoni, and the White-headed Kingfisher (*H. semicærulea*). The halcyons are often found in very dry tracts of country, far from water, their food consisting principally of insects, land molluscs, and small reptiles.

Family BUCEROTIDÆ. — We have five species of Hornbill, including the Great Ground Hornbill (*Bucorax caffer*), all of which, with the exception of the foregoing, belong to the genus *Lophoceros*. The Ground Hornbill is a large and singular bird, a terrestrial development of the Picarian form. Its beak is enormous, and black in colour, as is the casque surmounting it, and the whole of its funereal plumage, with the exception of the white wing pinions. There are large bare patches on the face and round the eye, the former red, the latter blue, as also is the wattle on the throat. They are foul feeders, devouring all kinds of offal, together with snakes and other reptiles, frogs, mice, and small birds. They associate together in small flocks in the Low Country, the only part of the Transvaal where I have seen them, and where they are very numerous. Their cry is a weird, mournful, drumming noise, which, heard in the early morning and at a great distance, I have sometimes mistaken for the moaning grunt of some far-off lion, wending his way home to his lair after a night's prowl. The Trumpeter Hornbill (*Bucanistes bucinator*) is found in the Transvaal bushveld. The Red-billed Hornbill (*Lophoceros erythrorhynchus*) nests in holes in trees, and the fact is well known to naturalists that when the hen bird enters the hole for the purpose of incubation the male bird promptly blocks up the hole with mud, merely leaving an opening large enough to enable him to pass in the necessary food-supply to his mate and her little family. The male bird procures all the food for this family till they are ready to fly. The other species are the Yellow-billed (*L. flavirostris*), and *L. epirhinus*.

Family UPUPIDÆ. — Sub-family UPUPINÆ.—Represented solely by the South African Hoopoe (*Upupa africana*).

Sub-family IRRISORINÆ.—Includes two species, the Red-billed Tree Hoopoe (*Irrisor erythrorhynchus*), and the Scimitar-billed Tree Hoopoe (*I. cyanomelas*). The former bird is gregarious to a greater extent than the latter, which usually keep in pairs, otherwise their habits are similar. They are noisy birds, keeping up a constant chattering in the bush, particularly when anyone disturbs them. They live upon insects, in search of which they creep about over and under the branches like the Tree Creepers. They nest in hollows in the trees. The Red-billed species is subject to considerable variation in its plumage, particularly in regard to the oval white spots on the first three secondaries, one such spot only being present in some specimens.

Order: PSITTACES.

Family PSITTACIDÆ. — Sub-family PSITTACINÆ.—The parrots are very poorly represented throughout Africa, and particularly so in the southern division of the Ethiopian sub-region. We have but one indigenous genus, *Poeocephalus*, represented by two species, Meyer's Parrot (*P. meyeri*), and *P. fuscicapillus*, the East African Parrot. The handsome *P. robustus*, Le Vaillant's Parrot, may also be found in the Colony, though I have never met with it. It is a green bird, with some blue and yellow markings. Its cry is singularly harsh and loud.

Sub-family PALÆORNITHINÆ.—Represented by the Rosy-faced Lovebird (*Agopornis roseicollis*).

Order: COLUMBÆ.

Family TRERONIDÆ.—First on the list of the Pigeons and Doves of this Colony stands the genus *Vinago* (Fruit Pigeons), the only species I have collected in this Colony being *V. delalandii*, though I believe *levaillanti* is also an indigenous form. I may here remark upon the peculiar construction of the foot of the Fruit Pigeon, which is becoming adapted to the climbing habits of these birds, and is assuming a distinctly zygodactylous character.

Family COLUMBIDÆ. Sub-family COLUMBINÆ.—The purple Wood Pigeon (*Columba arquatrix*) and *C. phænota* are also found in this Colony. We have two turtle doves—the Cape Turtle Dove (*Turtur capicola*) and the Senegal Turtle Dove (*Turtur senegalensis*). The Namaqua Ground

CATTLE, AND EGRETS IN ATTENDANCE.

Dove (*Æna capensis*) is the most daintily beautiful form amongst all the numerous doves and pigeons of this country. The breast, throat, and chin are of the intensest black, the upper parts a delicate ash-grey, the primaries warm red, edged with dark-brown, secondaries blue-grey with purple spots, and tail barred with black and white. These birds spend most of their time upon the ground, though when disturbed usually settle in the lowest branches of the trees. The hen lays two white semi-transparent eggs, the shells being so thin that the contents impart a rosy tint to them. They usually keep in pairs, and their "coo" is particularly sweet and melodious. Another very beautiful bird is the Bronze Spotted Wood Dove (*Chalcopelia afra*). I think it likely that the dainty little White-breasted Ground Dove (*Tympanistria tympanistria*) may also be found in this Colony.

Order : GALLINÆ.

Family PTEROCLIDÆ. — There are three species of sand grouse found in this Colony—the Namaqua, the Variegated, and the Double-banded. The first of these, *Pteroclurus namaqua*, is known generally as the Namaqua Partridge. Its flight, like that of all the sand grouse, is rapid and sustained. They visit their drinking places about 8 a.m. or 9 a.m., in large flights, but during the day usually scatter over the veld in pairs. The Variegated Sand Grouse (*Pterocles variegatus*) is more local in its habitat than the foregoing. These birds are usually the first to arrive at the drinking places, where they appear just after sunrise, some two to four hours earlier than the Namaqua. The Double-banded Sand Grouse (*P. bicinctus*) is the most handsome of the group. The Yellow-throated Sand Grouse (*P. gutturalis*) is also a resident.

Families NUMIDIDÆ, PERDICIDÆ.—The above, with the subfamilies *Perdicinæ*, *Turnicinæ*, and *Coturnicinæ*, embrace the Guineafowls, Francolins, Quails, and Hemipodes. There are two species of Guineafowl in the country, the Common (*Numida cornuta*) and the Crested Guineafowl (*Guttera edouardi*), and no fewer than ten Francolins, eight belonging to the genus *Francolinus* and two to *Pternistes*. The Francolins and other game birds being dealt with in my contribution on "Sport in the Transvaal," I am necessarily compelled by the limited amount of space at my disposal to refer the reader to that article for further information on the subject. I will merely add here that these birds (Francolins) do not take kindly to domestication, and generally die after a few months of captivity. The Quails are of two species, *Coturnix capensis* and *C. delegorguei*. The former is found pretty generally in all suitable localities, but for some reason, probably connected with migratory habits, is more plentiful in some seasons than in others. The latter species, the Harlequin Quail, is somewhat larger than *C. capensis*, and

CROWNED PLOVER
(*Stephanibyx coronatus*).

THE THICK-KNEE
(*Œdicnemus capensis*).

is a much more handsome bird, but I fancy is of rare occurrence in this Colony. The *Turnicinæ*, or Hemipodes (often styled Bush Quails), have but one representative in the country, as far as I am aware. This is the Kurrichane Hemipode (*Turnix lepurana*). This tiny game bird is found in stretches of open grass land, but is nowhere plentiful. They usually keep in pairs, and at no great distance from water. They are exceedingly difficult birds to flush, and, being so diminutive, are not worth the trouble they give. Their colouration is very delicate and beautiful, being an admixture of various browns, cream-yellow, and orange. Finally, they may be considered a very low type of gallinaceous bird.

Order : STRUTHIONES.

Family STRUTHIONIDÆ.—Subfamily STRUTHIONINÆ.— Represented by but one genus and species, *Struthio australis*, the South African Ostrich. Quite a number of these birds still find a home in the bushveld of the northern and north-eastern Transvaal.

Order : GRALLÆ.

Sub-order : ALECTORIDES.

Family GRUIDÆ. — We have several species of cranes in the Transvaal, the most striking form of which is the "Mahem," or Crowned Crane (*Balearica regulorum*). The beautiful Stanley Crane (*Tetrapteryx paradisea*) is a well-known species. They are very vigilant birds, and feed largely upon fish, reptiles, frogs, and molluscs. They are also very partial to certain kinds of grain, and for this reason are not specially protected in this Colony. The handsome Wattled or Bell Crane (*Bungeranus caruneulatus*) and the delicately-formed Demoiselle Crane are resident forms.

Family OTIDÆ. — Those grand game birds, the Bustards, which include the "Paauws" and "Korhaans," as they are here styled, are considered in the section devoted to sport.

Sub-Order : HERODIONES.

Family CICONIIDÆ. — Of the Storks we have the White-bellied (*Abdimia abdimii*), the strange Marabu (*Leptoptilus crumeniferous*), also *Cieonia alba*, *C. niger*, *Anastomus lamelligerus*, and the rare *Jabiru* (*Ephippiorhynchus senegalensis.*) The Wood Ibis (*Pseudotantalus ibis*) is a Transvaal form. Storks are useful as energetic destroyers of locusts. The Marabu I have only met with in the Low Country, but they are nowhere so plentiful as in Central Africa. They are usually found in the company of vultures, which scavengers they much resemble in their fancy for carrion,

though they do not appear to care for so advanced a stage of decomposition as is dear to the heart of the vulture. They usually arrive at a carcase after

GRIFFON VULTURE (*Gyps kolbi*).

most of the vultures have already gathered to the feast, but on their arrival very quickly alter the position of affairs, and, aided by their commanding height and terrible beaks, keep the vultures at a very respectable distance till they have satisfied their appetites. The much-prized Marabu feathers form the under tail-coverts, and appear only to attain their full growth in the summer time.

Family ARDEIDÆ.—The Herons found in the Transvaal belong to the sub-family *Ardeinæ*, and include the purple Heron (*Ardea purpurea*), the Black-headed Heron (*Ardea melanocephala*), and the handsome Rufous-bellied Heron (*Erythrocnus rufiventris*), the common Heron (*Ardea cinerea*), the Night Heron (*Nycticorax nycticorax*), the White-backed Night Heron (*N. leuconotus*), and *Butorides atricapilla*. That splendid bird the Goliath Heron (*A. goliath*) is of rare occurrence. The almost inaccessible situation in which its nest is usually placed is here illustrated.

Sub-family HERODIINÆ. — Represented by the Squacco Heron (*Herodius ralloides*), the Great White Egret (*Herodias alba*), the Little Egret (*H. garzetta*), the Short-billed Egret (*Mesophoyx brachyrhyncha*), and the Buff-backed Egret (*Bubulcus ibis*).

Sub-family BOTAURINÆ.—The African Bittern (*Botaurus capensis*), the Lesser Bittern (*Ardetta payesi*), and the African Dwarf Bittern (*Ardeirallus sturmi*) are included in the *Botaurinæ*.

Sub-family SCOPINÆ.—Has but a single representative, the Tufted Umbre (*Scopus umbretta*) — called "Hammer-kop" in the vernacular.

Family TANTALIDÆ. — Represented by the genera *Plegadis*, *Hagedashia*, *Ibis*, and *Geronticus*. The Hagedash Ibis (*Hagedashia hagedash*) is a well-known form, their peculiarly loud and strident cries of "Hah-de-dah, hah-de-dah!" as they fly to and fro from their feeding grounds at sunrise and sunset having given their local name "Hadedah." *Geronticus calvus* (the Bald Ibis) is called out here the Wild Turkey! The food of the ibises consists largely of insects, mollusca, frogs, and small reptiles, though they are also stated to be scavengers.

Sub-Order: FULICARIÆ.

Family RALLIDÆ.—Sub-family RALLINÆ.—The Rails, including the Crakes and the Galinules of the next sub-family, form a group of birds

THE EARED VULTURE

(*Otogyps auricularis*).

Photo by L. T. GRIFFIN, Pretoria.

representing a very generalised type, having affinities with the herons, plovers, bustards, and screamers, and with the gallinaceous birds through the Hemipodes, or three-toed quails. The Rails are represented by one species—the Caffre Rail (*Rallus cærulescens*)—and the Crakes by five species, the Cornerake (*Crex pratensis*), *C. egregia*, *Ortygometra pusilla*, *Saurothura rufa*, and the White-winged Crake (*Coturnicops ayresi*).

THE MARTIAL EAGLE

(*Eutolmaetus bellicosus*).

Sub-family GALLINULINÆ. — This group embraces the coots, water-hens, and gallinules. They are highly carnivorous in their habits, devouring fish, small birds, and mammals, as well as insects. I have observed four species in the Colony—the South African Moorhen (*Gallinula chloropus*), the Rufous-knobbed Coot (*Fulica cristata*), the handsome Purple Gallinule (*Porphyriola alleni*), and the still more striking Green-backed Gallinule (*Porphyrio smaragdonotus*). The singular Finfoot (*Podica petersi*) of the sub-family *Heliornithinæ* is a bird of very wide distribution, though nowhere of frequent occurrence. It is a ready diver, and can remain a long time under water. These birds are very difficult to rear in confinement, when they usually refuse all food.

Order: CHARADRIIDES.

Family CHARADRIIDÆ.—Sub-family CURSORINÆ.—I have only observed four species in this Colony—namely, Burchell's Courser (*Cursorius*

ruius), *C. temminckii*, *Rhinoptilus africanus*, and *R. chalcopterus*.

Sub-family CHARADRIINÆ. — Somewhat numerously represented by six genera, which include *Hoplopterus* and *Lobivanellus*, the Spur-winged Plovers; *Vanellus* and *Stephanibyx*, the Lapwings; and *Oxyechus* and *Ægialitis*, the Sand Plovers. The Pied Spur-wing (*Hoplopterus speciosus*) is a well-known form. It is exceedingly noisy on the wing, and has been called the "Blacksmith Plover" on this account. Its food consists of insects and worms. The Wattled Spur-wing (*L. lateralis*) and the White-headed Wattled Plover (*Xiphidiopterus albiceps*) belong to the same group. The Crowned Lapwing (*Stephanibyx coronatus*) is gregarious in its habits, and its shrill cries are frequently heard during the night. *Vanellus inornatus* is another representative form, though of rare occurrence. The Sand or Shore Plovers are represented by *Ægialitis tricollaris* (Treble-collared Sand Plover) and the Yellow-breasted Sand Plover (*Æ. pecuaria*). This latter is a bold and fearless little creature, it feeds on insects, and has often been called the "Seacow bird," being supposed to dance attendance on the hippopotamus. The Ringed Plover (*Ægialitis hiaticola*) also occurs in this Colony.

Sub-family GLAREOLINÆ. — Is represented by one species—the Black-winged Pratincole (*G. melanoptera*), usually known as the Locust Bird.

Sub-family ÆDICNEMINÆ. — Represented by but two species, *Edicnemus vermiculatus* and *Æ. capensis*. These handsome game birds are usually known as "Dip-kops" amongst local sportsmen, but their actual name of "Thick-knee" is even a more ugly one. These birds live principally upon insects.

Family SCOLOPACIDÆ. — Includes the snipes and stilt plovers belonging to the genera *Himantopus*, *Hæmatopus*, *Numenius*, *Totanus*, *Ancylochilus*, *Tringa*, *Tringoides*, *Rhycophilus*, *Paroncella*, *Gallinago*, and *Rostratula*. There are three species of snipe met with in the Colony, the Great Snipe (*Gallinago major*), the beautiful Painted Snipe (*Rostratula capensis*), and the Black-quilled Snipe, often styled the African woodcock (*Gallinago nigripennis*). Of stilt plovers there is but one species in this Colony, the Black-winged Stilt (*Himantopus himantopus*), and I believe but two curlews—the common variety (*Numenius arquatus*) and the tiny Pigmy Curlew (*Ancylochilus subarquatus*). The Whimbrel (*N. phæopus*) is also a resident. The Ruff (*Pavoncella pugnax*) is also a Transvaal bird. The Greenshank (*Totanus nebularius*) and the commoner *Totanus stagnatilis* are found in the Colony, as also are two sandpipers—the common form (*Tringoides hypoleucus*), and the Bush Sandpiper (*Rhycophilus glareola*), the latter a singularly tame bird. They are all great destroyers of insects and worms.

MARTIAL EAGLE WITH WINGS OUTSPREAD.

THE SECRETARY BIRD
(*Secretarius reptilivorus*).
Photo by L. T. GRIFFIN, Pretoria.

Order: ACCIPITRES.

Sub-Order: FALCONES.

As might be expected in this land of abundant fauna, the raptorial birds are well represented.

Family VULTURIDÆ.—Sub-family NEOPHRONINÆ. — Represented by the one species, *Neophron percnopterus*. It is a peculiarly foul-feeding bird.

Sub-family VULTURINÆ. — We have the following species in this group:—The Great-eared Vulture—the "Zwaart Aasvogel" of the Boers—(*Otogyps auricularis*), the common Fulvous Vulture (*Gyps fulvus*), the White-headed Vulture (*Vultur occipitalis*), and the Griffon Vulture (*Gyps kolbii*).

Family FALCONIDÆ. — Sub-family AQUILINÆ. — The Eagles are numerously represented. *Aquila rapax* (the Tawny Eagle) is a very destructive bird, devouring small quadrupeds, birds, reptiles, rats, frogs, and even carrion. Its flight is heavy, though strong at high altitudes.

Helotarsus ecaudatus (Baleleur Eagle). This is a most handsome bird, though its peculiarly short tail, from which it takes its specific name, somewhat detracts from its appearance.

Eutolmaetus bellicosus. The magnificent Martial Eagle, and the equally handsome *E. coronatus* (the Crowned Hawk Eagle), are the finest of the group. The Booted Eagle (*E. pennatus*) is also a resident. Another beautiful but much smaller bird is the African Crested Eagle (*Lophoaetus occipitalis*). Wahlberg's Eagle (*Aquila wahlbergi*), and the Black-breasted Harrier Eagle (*Circaetus cinereus*), the Vulturine Sea Eagle (*Gypohierax angolensis*), and the Southern Lammergeier (*Gypaetus ossifragus*), are other representative forms. Perhaps the most strikingly handsome of all the eagles is the African Fish Eagle (*Haliaetus vocifer*), with his plumage of rich chocolate brown and snowy white. I have only met with this fine bird on the Limpopo and Lower Sabi Rivers. In Central Africa it is extremely common, especially along the Zambesi.

Asturinula monogrammica, the One-streaked Buzzard Eagle, is also found in this Colony.

Sub-family BUTEONINÆ. — *Buteo jakal* — the Jackal Buzzard. *B. desertorum*—the Rufous Buzzard.

Sub-family FALCONINÆ.—The genus *falco* is represented by *F. biarmicus* (the handsome Lanner Falcon) and *F. minor* (the South African Peregrine). We have three Kestrels — *Cerchneis rupicolis* (the South African Kestrel), *C. rupicoloides* (the Greater African Kestrel), and *C. naumanni* (the Lesser Kestrel). *Erythropus amurensis*, the Eastern Red-legged Kestrel, is a resident form, and *Erythropus vespertinus* (the Western Red-footed Hobby) I have once observed in the Northern Transvaal during the summer. The Rufous-necked Falcon (*F. ruficollis*) appears occasionally in the Lydenburg district.

Sub-family MILVINÆ. — *Elanus caerulens*, the Black-shouldered Kite; *Milvus aegyptius*, the Yellow-billed Kite; *Milvus migrans*, the Black Kite.

Sub-family ACCIPITRINÆ. — There are four or possibly five species of *Melierax*—*M. polyzonus* (the Many-banded Goshawk), *M. gabar* (the Red-fronted Goshawk), *M. niger* (the Black Goshawk), and *M. canorus* (the Chanting Goshawk). The latter bird has a graceful skimming flight. It usually watches for its prey from the topmost branch of a tree, where it will remain motionless for hours together. The Many-banded Goshawk (*Astur polyzonoides*) is an indigenous species.

The Sparrow Hawks are not numerous, two species only having been observed by the writer—viz., the African Sparrow Hawk (*Accipiter rufiventris*), and the fearless little Minulle (*A. minullus*).

Sub-family CIRCINÆ. — Represented by three species—*Circus ranivorus* (the South African Marsh Harrier), *C. macrurus* (the Pallid Harrier), and *C. cinerarius* (Montagu's Harrier).

Family PANDIONIDÆ. — Represented by *Pandion haliaetus*, the Osprey.

SECRETARY BIRDS IN NEST.

Family SERPENTARIIDÆ.—With one species — the well-known Secretary Hawk (*Serpentarius secretarius*). This bird was once looked upon with almost veneration in this country, on account of the incessant war it wages upon snakes, lizards, mice, locusts, etc., and was specially protected, a fine of £50 being the penalty for destroying one. Of late years, and particularly since the preservation of game has been more thoroughly taken in hand, the Secretary Bird has been denounced as a fraud, being one of the most persistent destroyers of young game; consequently it is no longer protected. It is an indefatigable "foot-slogger," but its powers of flight are very limited, it being unable to sustain itself in the air for any lengthy period.

Order: ANSERES.

Family ANATIDÆ.—This order, the members of which are all classed as sporting birds, and are dealt with in the article on "Sport," requires very little consideration here. The South African Pochard (*Nyroca erythropthalma*), which is closely allied to the English bird, is the wariest and most rapid in its flight of all the group.

The geese belong to three genera—*Plectropterus* (the Spur-winged goose), *Chenalopex* (the Egyptian goose), and *Nettapus*, represented by the quaint little Dwarf Goose (*Nettapus auritus*). The White-masked Tree Duck (*Dendrocygna viduata*) is not uncommon in the Transvaal.

Order: STEGANOPODA.

Family PELICANIDÆ.—We have under this order only two species—*Phalacrocorax africanus* (the Lesser Cormorant) and *Plotus rufus* or

levaillanti (the African Darter or Snake Bird—so called on account of the rapidity of its movements when taking its prey from the water, and of its long, flexible snake-like neck).

The Order *Gariæ* has but two representative species, the White Winged Black Tern (*Hydrochelidon leucoptera*) and the African Skimmer (*Rhyncops flavirostris*) belonging to the Family *Rhyncopidæ*.

The Pygopodes are represented by the Crested Grebe (*Podicepes cristatus*), the Eared Grebe (*P. nigricollis*), and the Cape Dab-chick (*P. capensis*).

In conclusion, I may remark that, although the number of singing birds in this country is far less, proportionately, than in the homeland, it is pure fiction to say that South Africa has none. We have nothing to compare with the nightingale, blackbird, thrush, or lark, yet we have some good performers, and I have often heard the bush positively ringing with their melody.

CLASS: *AMPHIBIA*.

SUB-CLASS: LISSAMPHIBIA.

Order: ANURA (TAILLESS.)
Sub-Order: AGLOSSA.

This sub-order is very poorly represented in the Transvaal, being limited, as far as I am aware, to but one species of the family Xenopidæ—viz., *Xenopus lævis*, the Clawed Toad. It is a well-known form, entirely aquatic in its habits, floating on the water for hours together with only the nostrils above the surface. Its upper jaw is furnished with teeth. It is known to the Boers as the "Flat-hander" (flat-handed), on account of its peculiarly webbed feet. It is very destructive to fish ova.

Sub-Order: PHANEROGLOSSA.

Family BUFONIDÆ.—This family also is poorly represented, there being but three species, of which *Bufo regularis* is the most common and widely-distributed form, and *B. pantherina* (the Pantherine Toad) the prettiest, being a really beautifully-coloured little creature.

Family ENGYSTOMATIDÆ.—Sub-family ENGYSTOMATINÆ.—This family has three representative genera—*Breviceps*, with two or possibly three species; *Hemisus*, with one; and *Phrynomantis*, with two.

Family RANIDÆ.—Sub-family RANINÆ.—This is altogether the most typical and the largest represented group, including several species of the genera *Rana* (including *Pyxicephalus*, an edible frog), *Rappia*, *Rhacophorus*, *Chiromantis*, and *Arthroleptis*.

CROCODILE (*Crocodilus niloticus*).

CLASS: *REPTILIA* (REPTILES).

It is a far cry back into that dim and distant past when, following upon the close of the great struggle for supremacy between the two mighty elements, fire and water, the earth entered upon its great Primary Epoch, and Nature set herself to work in grim earnest upon the great mystery of creation. During the Primitive Era preceding this period, the temperature of the earth and of the water which covered the greater part of it was too high to admit of the appearance of life within it. And, moreover, our globe was cradled in the thick blackness of night, a blackness which the sun's rays were powerless to penetrate, and, as without light there is no life, an additional reason is provided why nothing existed on the burning soil of the dark and silent earth. Gradually, however, the surface crust cooled off, and the atmosphere became purified by the constant torrential rains, till at last the sun's rays pierced the gloom, the earth entered upon the Primary Epoch, and plants, followed by animal life, appeared upon its surface. As might be imagined, when we consider how vast an area of the surface was covered by the sea, it was probably in this element that the first grand mystery of creation was accomplished, when the waters slowly cooled sufficiently to permit of the existence of organised beings within their depths. *Molluscs*, *Crustaceans*, *Corals*, were followed, as organisation became more complete, by the "armoured" and "semi-armoured" fishes of the Devonian Period, and the *Coleoptera*, *Orthoptera*, and *Neuroptera* of the Carboniferous Period. It was during the latter part of this period that the first reptile, the *Archegosaurus*, appeared, remains of which have been found in the coal measures of America and Germany. But it was not until the dawn of the Secondary Epoch that animal life of a more perfect development tenanted the earth, and during this period reptiles multiplied in a marvellous manner, becoming indeed the "lords of creation," although later on, during the *Oolitic* sub-period, mammals also made their appearance. It was during the Triassic period of the Secondary Epoch, when many of the curious crustaceans (*Trilobites*) of the former age had disappeared, and the *Ganoid* and *Placoid* fishes of the Devonian

period were becoming fewer in number, that two huge amphibian reptiles, the *Labaryntliodon* and the *Nothosaurus*, a species of marine crocodile, evidenced the strides that nature was making in the development of organisms. The great reptiles of this period, indeed, were as complicated in structure as the mammals of a later one. During the Jurassic period came the *Ichthyosaurus*, and another air-breathing marine carnivore, the *Plesiosaurus*, creatures which bore witness that organisation and physiological functions had been improving unceasingly, each extinct genus presenting modifications of each organ tending towards higher development. This is most clearly shown in the structure of the weird, hideous, flying reptile, the *Pterodactyle* of the Liassic period, a creature in appearance half vampire bat and half crocodile. The earth had now cooled progressively up to this period, the rains were less abundant, the pressure of the atmosphere was lessened, and all these circumstances favoured the appearance of a multiplication of innumerable species whose singular forms from this time forward showed themselves upon the earth, each in its turn still tending towards higher development. With the appearance in greater numbers of huge mammalian forms, the reptiles fell gradually into the background, but most people will agree that they have held their own uncommonly well in this Africa of ours. After this glance back into the mysterious past, we will proceed to consider a few of the prominent forms of reptile life at the present day existing in this Colony.

LARVÆ OF OLEANDER HAWK MOTH (*Deiliphila nerii*), **feeding.**

SUB-CLASS: CHELONIA.

Order: THECOPHORA.

Sub-Order: CRYPTODIRA.

This order, which embraces the Tortoises and Turtles, is not extensively represented in this Colony.

Family TESTUDINIDÆ. — The true tortoises are referable to but one genus, *Testudo*, with *T. pardalis* and *T. ungulata*. We have one Areolated Tortoise (*Hemopus femoralis*), and one *Cynixis*.

Sub-Order: PLEURODIRA.

Family CHELYDIDÆ.—Includes a few fresh-water carnivorous tortoises belonging to the genera *Sternotherus* and *Pelomedusa*.

Sub-Order: TRIONYCHOIDEA.

Family CYCLODERMA.

Genus *Trionyx*.

The members of this group are entirely aquatic, and highly carnivorous. They are covered with a soft but tough and leathery skin. They are considered by some natives to be good eating, but—*chacun à son goût*—they are too odoriferous for most white people.

SUB-CLASS: CROCODILIA.

Order: EUSECHIA.

Family CROCODILIDÆ.—As the sole representative of this family we have the justly-dreaded Crocodile (*Crocodilus niloticus*). Fortunately this saurian is comparatively rare, and confined to a few of the larger rivers in the Low Country. They never attain to the enormous dimensions of the crocodiles of Central Africa, but they are ugly customers, notwithstanding. The largest I have seen in the Transvaal was one I shot myself on the Lower Sabi River. It measured, I think, 12 ft. 6 in. or 7 in. Their normal diet is fish, and I think they but rarely catch game. As some evidence of the enormous strength which these creatures possess, I may briefly relate an incident that happened in 1893. I was down lion shooting on the Matamiri, and, having located the whereabouts of five lions, I shot a big waterbuck bull for bait, intending to visit the carcase at dawn next day and get a shot when the lions returned. I placed the carcase near to the remains of an impala which the lions had devoured, and about 20 ft. distant from a bank 9 ft. high, below which was a level stretch of sand extending 100 yds. to the water's edge.

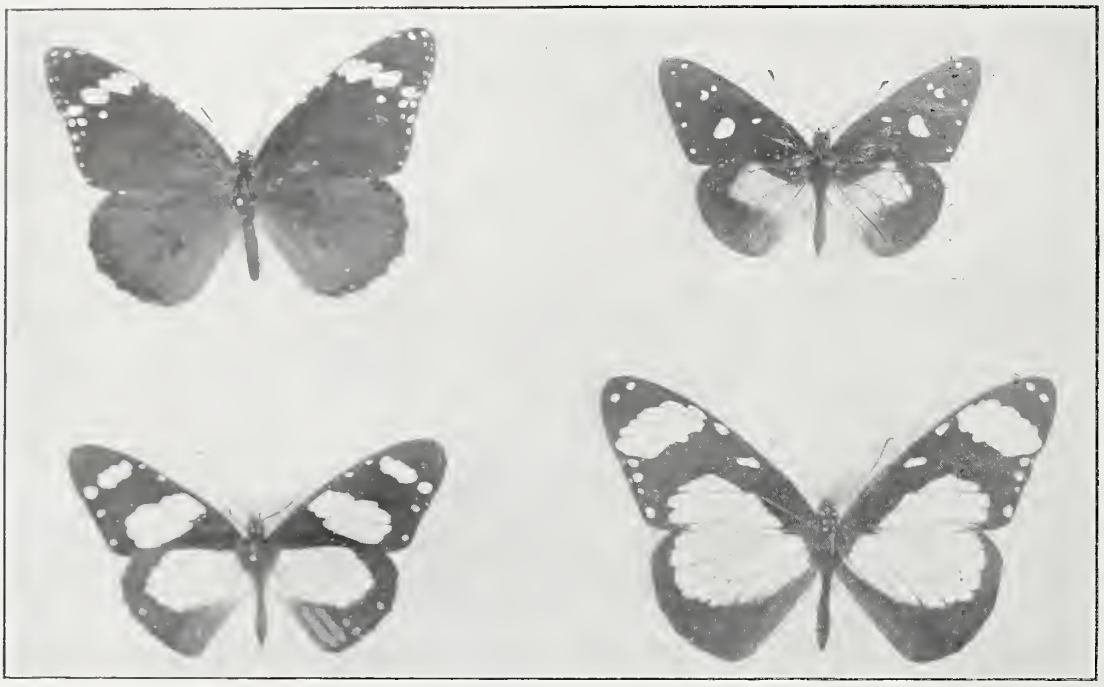
During the night a crocodile seized the carcase, dragged it through the thick scrub, down the bank, over the heavy sand, and into the water. When we consider that the carcase weighed about 400 lbs., and that it was carried off by a single crocodile, I think it will be admitted to be an astonishing feat, especially as the reptile was operating on dry land, and consequently out of its element.

Family ACONTIDÆ. — Represented by one species, and distinguished by the possession of lower eyelids and rudimentary upper ones.

Family ZONURIDÆ.—With two genera, *Zonurus* and *Chamæsaura*. The latter are furnished with a snake-like body and vestigal limbs. In *Chamæsaura anguina* these limbs are mere stumps, and are even less developed in *C. macrolepis*. The two genera are represented in the Transvaal by some six species. The *Zonuridæ* form an interesting group, apparently connecting the New World *Iguanidæ* with the *Anguidæ*.

They are expert anglers, and the last-named species (and probably the other) is able to climb trees with ease. They never travel far from water, and when alarmed scuttle back at once to their natural element. The skins have a considerable market value.

The family *Gerrhosauridæ* is represented by several species of two genera.



Danais chrysippus.
Exp. 3 in.

Amauris albimaculatus.
Exp. 2 in. 5 lin.

Amauris ochlea.
Exp. 2 in. 10½ lin.

Amauris dominicanus.
Exp. 3 in. 6½ lin.

SUB-CLASS: SAURIA.

Order: LACERTILIA.

Sub-Order: GECKONES.

Family GECKONIDÆ. — Sub-family GECKONINÆ.—Represented by the *Ptenopus gecko*, and possibly by a *Stenodactylus*.

Sub-Order: LACERTÆ.

Family AGAMIDÆ.—This family is quite numerously represented, many of the forms being of beautiful colouration and shapely outline. They are quick and lively in their movements. Their food consists almost entirely of insects. As is the case with the Chameleons and the *Varinidæ*, the tail if once lost is never renewed, whereas a lost tail is always replaced by a new one in the *Zonuridæ*.

Family VARANIDÆ.—In this family the nostrils form an oblique slit nearly central between the eyes and the tip of the snout, and the throat has a transverse fold. It is represented by two species of the genus *Varanus*, of which *Varanus albigularis* (the White-throated Monitor) is the commonest form. These creatures are much misnamed, British colonists usually calling them "iguanas" and the Dutch "legavaan." *V. ocellatus* is of less frequent occurrence. They attain a length of 6 ft. to 6½ ft., are carnivorous in their habits, and daring robbers of eggs and young poultry.

Family SCINCIDÆ.—Represented by two genera, *Scincus* and *Mabuia*.

Family ANELYTROPIDÆ.—Represented by one genus, *Typhosaurus*.

Family AMPHISBÆNIDÆ. With but one species.

Sub-Order: CHAMELEONTES.

Family CHAMELEONTIDÆ.—The Transvaal has several species of these singular reptiles, Madagascar, however, being the richest in the possession of about twenty-five species out of a total of some fifty known to science. Some of the species are oviparous; others, as for instance our common form, *Chamæleon pumilus*, are viviparous. Some attain a length of 18 in. Their capabilities in the way of changing their colour are sufficiently marvellous without requiring the assistance of exaggeration which is so

often indulged in in connection with these creatures. The changes very rarely extend beyond various shades of their normal green colour, and of purplish brown, with a tendency towards more brightly-coloured spots and patches. In the direct rays of a hot sun they almost invariably assume a dull leaden colour. The change of colour continues even during the moulting, a process which is exceedingly interesting. Like the snakes, they obtain assistance from rough stones and twigs, against which they rub themselves in order to get rid of their old dress. Chameleons are quite helpless in water, and soon roll over on their sides and ultimately drown. They are not too amiable in disposition until thoroughly tamed, and will bite savagely at the hand that touches them.

Order: OPHIDIA (SNAKES).

This order embraces a group of reptiles which are looked upon with dislike and horror throughout the world, and the fact that comparatively few of the numerous species are at all harmful does not affect the matter at all—the innocent have to suffer with the guilty. They are undoubtedly the most highly-specialised branch of the Sauria.

Families GLAUCONIIDÆ and TYPHLOPIDÆ.—These families embrace the Burrowing Snakes, creatures which bear a strong resemblance to the Scincoid Lizards of the order *Lacertilia*, and which have even been referred to that order. Eminent herpetologists, however, and amongst them no less an authority than Dr. Günther of the British Museum, are satisfied that they are referable to the *Ophidia*, mainly on account of the formation of the lower jaw-bone, which possesses the very characteristic ophidian feature of being loosely connected with the upper one. This structure, indeed, is only less developed in these than in typical forms. They feed on insects and worms, and burrow in the ground. All members of the families are viviparous. Both are represented in the Transvaal, being of very frequent occurrence in some districts, such for instance as Pilgrim's Rest, Mac-Mac, and the Waterfall Valley. The commonest and best known species is *Typhlops obtusus*.

Acræa horta.
Exp. 2 in.

Acræa acara.
Exp. 2 in. 11 lin.

Acræa neobule.
Exp. 2 in. 6 lin.

Acræa anemose.
Exp. 2 in. 8 lin.

Family BOIDÆ. — Sub-family PYTHONINÆ.—Represented by one species, *Hortulia sebæ*. This is the well-known Rock Python, which attains large dimensions. I have seen a specimen 18 ft. 4 in. in length, and have myself shot one only two inches shorter. This latter had swallowed a young reedbuck ram entire—the horns, which were about 9 in. in length, protruding from the reptile's mouth as it lay dormant.

Family COLUBRIDÆ. Sub-family COLUBRINÆ.—This enormous cosmopolitan group includes not only a number of quite harmless snakes, but also many of the most deadly venomous forms which we have in Africa. These belong to the Sub-family *Elapinæ*, and include the Mamba (?), the Cobras, and snakes belonging to the genus *Causus*, which includes the well-known "*Schaapsteker*." We find little in the external appearance of the venomous members of the family to distinguish them from those which are innocuous. In their poison fangs they more nearly resemble the *Viperidæ* than the other members of the colubrines. Their fangs, however, are permanently fixed to the maxillary bone, which is nearly as long as that of the innocuous colubrines. The fangs are more or less erect, and are furnished with an external groove to permit of the passage of the poison from the glands to the wound. Frequently the maxillary bone carries one or more additional teeth at the back. The family comprises nine-tenths of all recent species of snakes, and includes forms which are strictly terrestrial, others which are as strictly arboreal, and others again aquatic in their habits. The family has been divided by Boulenger into three groups:—

Aglypha, having all teeth solid and not grooved. This group embraces the Sub-families *Colubrinæ* and *Rhacodontinæ*.

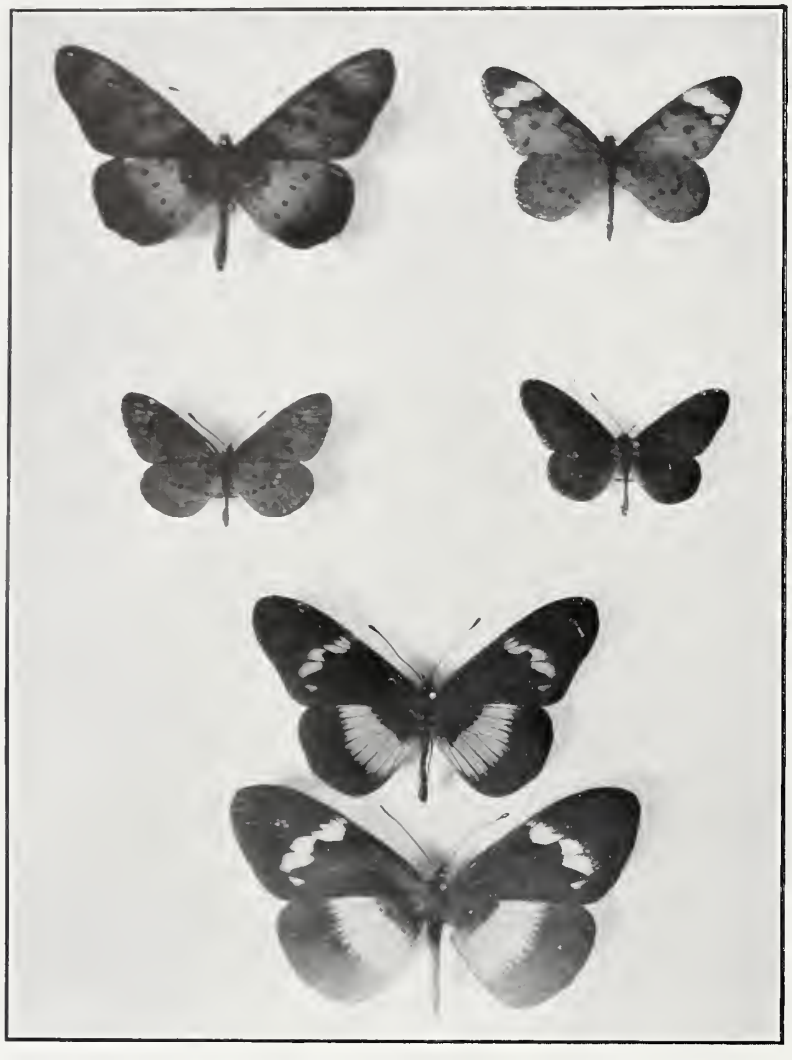
Opisthoglypha, having one or more of the posterior maxillary teeth grooved. All are more or less poisonous, though practically harmless to man, as the poison is not virulent, nor in great

Meneris tulbaghia.
Exp. 3 in. 5½ lin.

Melanitis leda.
Exp. 3 in. 1 lin.

quantity, and the fangs are situated so far back as to be incapable of inflicting a serious wound. The group embraces terrestrial, arboreal, and aquatic forms.

Proteroglypha, having large grooved anterior maxillary fangs and smaller teeth in the maxilla behind the fangs.



Acræa natalica.
Exp. 2 in. 9 lin.

Acræa encedon.
Exp. 2 in. 3 lin.

Acræa rahira.
Exp. 1 in. 9 lin.

Acræa buxtoni.
Exp. 1 in. 7 lin.

Planema aganice.
Exp. 2 in. 9½ lin.

Planema aganice.
Exp. 3 in. 6 lin.

It includes the *Elapinæ*, which are amongst the most deadly of snakes.

The *Colubridæ* comprise nine-tenths of all recent species of snakes.

Sub-family COLUBRINÆ. — An overwhelming majority of snakes fall into this sub-family, which includes about 1,000 species distributed over the world. All are harmless, and with the exception of *Coronella* all are oviparous, the last-named group being viviparous. The sub-family is represented by two species of the genus *Rhinechis*, and, as far as I am aware, by but one of the genus *Psammophis*—the Hissing Sand Snake—though there is little doubt that the slender *P. elegans* is to be found within our limits. *Tropidonotus* is also represented.

Sub-family DRYADINÆ. — This embraces the more characteristic Colubrine forms known as Tree Colubrines, all of which are harmless. They may easily be distinguished from the Sand and other ground snakes by the fact that the pupil of the eye is horizontal, as also by the absence of the long anterior maxillary teeth. Of these we have that beautiful reptile *Bucephalus capensis*, and the still more gorgeously-coloured *B. viridis*. It is indeed a pretty sight to watch these brilliant reptiles gliding through the interlaced branches of the trees, now in shade, now in sunshine, looking like long strings of jewels, though usually the lightning-like rapidity of their movements defies all attempts of the observer to follow them. The last-mentioned reptile is often mistaken throughout the Transvaal for the Green Mamba, and is invariably so called. Personally, I have never seen the Green Mamba in this Colony, nor do I believe it is found here. *Dendrophis*, *Chlorophis*, *Leptophis*, and *Coronella* are represented.

Sub-family RACHIODONTINÆ. —Has one representative of the genus *Dasypeltis*—*D. Scabra*. It lives principally upon birds' eggs, and some of the vertebræ in the region of the neck have strongly developed processes which are directed forward and pierce the œsophagus, and thus serve for the purpose of breaking the egg-shells in their passage down the throat.

Sub-family ELAPINÆ. — The Elaps are all, without exception, exceedingly venomous snakes, some of them being the most dangerous known in Africa. Occupying the place of honour, we have the terrible and justly-dreaded Black Tree Cobra, or Black Mamba (*Dendraspis augusticeps*). I have never met with this snake outside the Bushveld, and even there it is not frequently encountered, though fairly plentiful. Their movements are extremely rapid. A bite from this creature is certain to prove quickly fatal, unless the instant application of a tourniquet above the spot bitten, followed by immediate cauterisation, be resorted to. This, however, is by no means sufficient precaution, and I think it very doubtful if any ordinary known remedy would be efficacious in the case of a mamba's bite. A subcutaneous injection of chloride of gold is said to be successful in the case of deadly snakes in the East, but this is a remedy altogether outside the range of ordinary application. Strong spirits of ammonia taken internally and also applied to the wound is a good remedy for the bite of most poisonous snakes, also brandy partaken of copiously until intoxication supervenes, when danger may be considered past. The natives use a powder which they always carry in little sachets of lizard or snake skin,

round the neck. I have known it fail in the case of a mamba bite, but twice successful on human beings bitten by a Puff Adder and a Berg Adder. I believe that the ingredients of this powder are extremely simple, and have been told by the natives that it is made by mixing the poison extracted from the glands of "a venomous snake" with a greyish brown powder obtained by pulverising the burnt leaves of a small aloe-like plant. At all events it is a most effective remedy in all but very extreme cases. It is applied both externally and internally. I may here remark that the natives of Swaziland have a legend concerning a still more dangerous snake than the Tree Cobra. The native name is "*'mpmembatwana*." I have only once seen it, when riding in company with one of my native hunters, and only for a few seconds, as I unfortunately failed to kill it owing to the long grass. As it raised itself from the ground it appeared to be from 3½ ft. to 4 ft. in length, the prevailing colour being marbled grey.

Three other Cobras, *Naja nigricollis*, *Naja flava* (the Brown or Yellow Cobra), and *Sepedon Hæmachates* (the Black Cobra, or "Zwaart Ringhals" of the Boers), are also most deadly snakes. The latter, indeed, I consider likely to be the most dangerous snake we have, as its bite is extremely poisonous, and it is the most vicious and aggressive snake in the country, and will dispute the right of way where others would endeavour to make good their escape at the first disturbing sound. *Causus rostratus* and *C. rhombeatus* (the "Schaap-sticker" of the Boers) conclude our notice of the Colubridæ.

Family VIPERIDÆ. — The Viperine snakes are represented in this country by the Sub-family *Viperinæ*, or True Vipers. The genus *Bitis* comprises three species of the Puff Adders, snakes which have attained a notorious reputation for venomous activity. The common Puff Adder (*B. arietans*) is the best-known form. It is of very sluggish habits, and thus can be easily avoided and killed. But on the other hand its habit of lying half-concealed in the hot dust or sand on a road or footpath, and its distinctively protective colouration, give sufficient cause for the widespread dread of this ugly reptile which obtains throughout the country.

B. cornuta, the Horned Puff Adder (or "Horseman" of the Dutch) I have never seen in the Transvaal, though I am assured that it does occur, and frequently in the north-west. The Berg Adder (*B. atropos*) is a beautifully-marked but exceedingly dangerous reptile, and withal of particularly ugly and repulsive shape. *B. inornata* is another common form.

In conclusion, I may state that the danger to life from snakes in this country is infinitesimal, not because of their harmlessness, for we undoubtedly have forms whose bite is as deadly as that of almost any snake in the known world, but because ninety-nine out of a hundred snakes are wary to a degree, and the moment a footfall is heard do their utmost to escape. They only use their fangs in self-defence, when trodden upon, or unable to make good their escape.

CLASS: *PISCES* (FISHES).

The Transvaal can scarcely be considered a first-class fishing country, yet here and there we meet with a few fish in the principal rivers. The subject is one which has been much neglected by naturalists, and there is great need of further careful research. Owing to the scarcity of perennial rivers in this Colony, the class is but inadequately represented. The commonest fish, and most widely distributed, are probably the Siluroids, of which the Barbel (*Glanis siluris* and *G. capensis*) are well-known forms. The former sometimes reaches enormous dimensions, the largest I have ever seen having been taken in Sekukuni's Country and in the Waterberg.

Pseudacræa tarquinia.
Exp. 2 in. 11 lin.

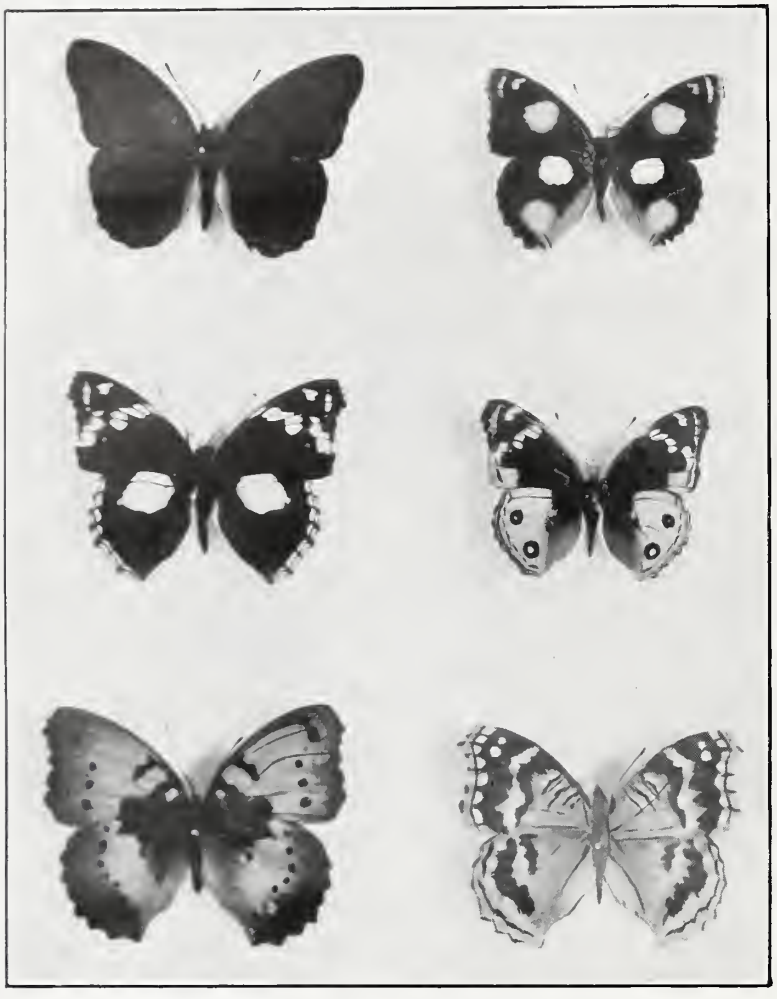
Pseudacræa trimenii.
Exp. 3 in. 2 lin.

Charaxes saturnus.
Exp. 3 in. 5 lin.

Hamanumida daedalus.
Exp. 2 in. 4 lin.

Charaxes cithaeron.
Exp. 3 in. 4 lin.

These fish, being quite capable of supporting life in a semi-dry mudhole, are naturally more fitted for existence in a country like this—where most of the "rivers" are such arrant shams, consisting of dry stony or sandy beds, with here and there a few small muddy pools along miles of their courses—than fish which prefer rivers with water in them. Eels are found in most easterly-flowing rivers of any size, and



Atella phalantha.
Exp. 2 in. 3 lin.

Junonia clelia.
Exp. 2 in. 5 lin.

Precis octavia.
Exp. 2 in. 5 lin.

Junonia cebrene.
Exp. 2 in.

Junonia boöpis.
Exp. 1 in. 10½ lin.

Precis sesamus.
Exp. 2 in. 5½ lin.

which are otherwise suitable, it being a singular fact that they are never found in any westerly-flowing stream. Some of them attain a great size.

The Red-finned Carp (*Pseudobarbatus burchelli*) is another of our indigenous fishes, also species of mullet, "Yellow" and "Silver" Fish (as they are locally termed), and a kind of perch. The Yellow Fish sometimes attains a weight of 5 lbs. to 6 lbs. in the lower courses of the perennial rivers, but the usual weight in the upper reaches seldom exceeds 2 lbs.

A "tiger fish" is found in some of the rivers, as also a small minnow-like creature which is capable of using its pectoral fins after the manner of flying fish, though unable to do more than skim the surface of the water. In the near future it may be anticipated that the efforts of the Trout Acclimatisation Society will result in permanently stocking all the suitable streams in the country with a supply of Brown Trout (*Salmo fario*) and Rainbow Trout (*Salmo iridens*).

The Mollusca of the Transvaal we must pass over without comment, the limits permitted us being already much exceeded.

ARACHNIDA (SPIDERS, SCORPIONS, ETC.).

The *Arachnidæ*, *Chilopodæ*, and *Diplopodæ* must also be dismissed with the briefest notice. The great Mygale and Scorpion Spiders are not very frequently met with, though in certain localities the latter are of very common occurrence. Their bite is extremely painful, and under certain circumstances very dangerous. A large species of Trapdoor Spider is common. There are several species of the genus *Nephala*, some of very beautiful colouration. They construct webs of very great strength, which are usually spread across disused paths and openings in the bush. We have also a very vicious black hairy spider with a singular process at the end of the tail. The bite of this creature is very severe.

The family *Epeiridæ* is represented by *Gastracantha*, and the widely-distributed *Argiope nigrovittata*. A lately-named species is *Nephila transvaalica*, distinguished by its black cephalothorax, which is covered with long silver hair.

The *Solfugæ*, *Araneæ* (family *Sparassidæ*) are represented by numerous species, *Oeypete megacephala* being an interesting form.

The sub-order *Acari* is also numerously represented, and Transvaal residents will probably be of the opinion that they already know too much about these repulsive creatures. The principal species with which this country is cursed are members of the family *Ixodidæ*, comprising the genera *Hyalomma*, *Rhipicephalus*, and *Amblyomma*. The species are the Striped-legged Tick (*Hyalomma ægyptium*), the Blue Tick (*Rhipicephalus decoloratus*), the Brown Tick (*R. appendiculatus*), the Black Tick (*R. simus*), the Red Tick (*R. evertsi*), and the Variegated Tick (*Amblyomma hebræum*). It is the Black, Brown, and Variegated Ticks that have been instrumental in spreading the terrible "East Coast fever" throughout the Transvaal.

Several species of scorpions are found in this Colony, belonging to the genera *Opisthopthalmus*, *Archisometrus*, and *Scorpio*. Centipedes are also of common occurrence in suitable localities, *Scolopendra morsitans* and *Tema-*

toptyeus afer being the most widely distributed species.

MYRIAPODA.

The *Myriapoda* are very numerously represented. They live principally upon decaying vegetable matter, and are quite harmless, though decidedly objectionable. They are very numerous at the commencement of the rainy season. The family *Glomeridæ* contains several species, amongst which are *Sphærotherium obtusum*, *Spirostreptus meinerti*, and two more recently named species, *Spirostreptus transvaalicus* and *S. pretoriæ*.

CLASS: *INSECTA* (INSECTS).

We have now to consider this class, with but very little space at disposal for dealing with so vast a subject. With comparatively few exceptions insects can scarcely be considered the terrible pest in this Colony that they are in more tropical climates, where one lives in a continual nightmare struggle with this hateful and repulsive creation. True, our fleas, termites, "sugar-ants," tsetse-flies, blue-bottles, "fish-moths," wasps, mosquitoes, gnats, and unfortunately a great many others, might be cited for the purpose of disproving this statement, but to the credulous I would say wait till you have lived in Central Africa, particularly in a hunter's camp, before you express too confident an opinion. Butterflies appear to be amongst the most harmless, as they certainly are amongst the most beautiful of insects, though we cannot say the same of them in their larval stage. Compared with those of tropical Asia and America, Madagascar, and West Africa, the Transvaal butterflies are far less strikingly beautiful both in form and colouration, just as they are less numerous—this Colony having comparatively few of the fifteen hundred or more forms which the Ethiopian region possesses. As a rule the area of distribution is very wide, and many forms which I have taken in the Cape Colony I also added to my collections from the Central African Lakes and the Rovuma River, N. Mozambique. Many collectors have no doubt had an experience somewhat similar to my own, when I first set eyes on *Acræa aglaonice* in Central Africa, and after infinite toil, and the loss of a particularly fine sable antelope bull (which I nearly ran up against with my butterfly net), I captured him. Six months later I walked a hundred yards from a friend's house in the Lydenburg district and took two fine specimens, male and female, of the same fly. As I have from time to time made extensive collections of the *Lepidoptera Rhopaloecra* and *Heterocera* in the Transvaal, I will enumerate the most important genera of which I have secured species, as being representative of the principal forms belonging to these orders found in the country. I present them in tabulated form, showing the number of species I have taken of each genus.

Families.	Sub-Families.	Genera.	Number of Species taken.
Nymphalidæ ..	Danainæ	Amauris	5
	,, ...	Danais	2
	,, ...	Limnas	2
	Satyrinæ	Mycalesis	2
	,, ...	Melanitis	1
	,, ...	Neocænyra	1
	Acræinæ	Acræa	7
	Nymphalinæ ..	Charaxes	10
	,, ...	Crenis	1
	,, ...	Catuna	1
	,, ...	Cymothœ	1
	,, ...	Atella	1
	,, ...	Euryphene	1
	,, ...	Eurytela	2
	,, ...	Euphœdra	1
	,, ...	Hamanumida ..	1 (Dædalus—very rare).
	,, ...	Junonia	4
	,, ...	Panopœa (?) ..	1
	,, ...	Pyrameis	1 (The well-known "Painted Lady" of world-wide distribution).
	,, ...	Neptis	2
	,, ...	Hypanis	1
	,, ...	Pseudacræa ..	2
Lycænidæ ..		Lycæna	14
		Lycænesthes ..	2
		Azanus	1
		Catochrysops ..	1
		Axiocerces	1
		Spindasis	1
		Castalius	2
		Iolaus	2
		Zeritis	3
Papilionidæ ..	Pierinæ	Terias	2
		Nychitona	1
		Pieris	3
		Mylothris (?) ..	1
		Herpænia	1
		Catopsila	1
		Eronia	1
		Belenois	2
		Teracolus	13 (Nine of these I have only met with and taken in the Lydenburg district).
	,, ...	Callidryas	1
	Papilioninæ ..	Papilio	7
Hesperidæ ..	,, ...	Hesperia	3
	,, ...	Rhopalocampta (?) .	2
	,, ...	Pamphila	4
	,, ...	Caprona	1
	,, ...	Pterygospidea ..	3
	,, ...	Cyclopides	6 (Four being from Lydenburg district).

Sub-order *Heterocera* (Moths).

Families.	Sub-Families.	Genera.	Number of Species taken.
Sphingidæ (Hawk Moths)	Sphinginæ	Deiliphila	1 (The Death's Head Hawk Moth).
		Acherontis	1
	Chærocampinæ .. (Silver Striped Hawk Moths)	Philampelus ..	1
		Chærocampa ..	4
	Nephelinæ	Nephelis	4
Nyctemeridæ ..	.. .. ..	Aletis	1
Saturniidæ ..	.. .. ..	Bunnea	2
Ommatophoridæ	.. .. ..	Patula	2
Agaristidæ ..	.. .. ..	Eusemia	5
Bombycidæ ..	.. .. ..	Limacodes	2

Other families represented are *Lithosiidæ*, *Zygænidæ*, *Tineidæ*, etc. It may be remarked here that the Transvaal has quite a number of the species of the genus *Lycæna*, some 22 or 24 representatives having been taken here: *osiris*, *iguota*, *hypopolia*, *palemon*, *tellicanus*, and *sybaris* being some of the forms I have not collected. The larvæ of one of the commonest of the above butterflies, the beautiful Orange Tree Butterfly (*Papilio demoleus*), is somewhat destructive to citrus trees. The female deposits her eggs on the leaves, upon which the larvæ, when hatched out, feed (though only eating the young shoots), and when fully grown seek a sheltered spot in the trees, where they assume a chrysalis form. Amongst the moths are also some well-known forms of considerable size which are destructive to trees and plants. The Willow Tree Hawk Moth (*Angelica tyrrhea*), as its name indicates, turns its attention to the willow trees and wattles. The damage is done by the larvæ, which feed on the leaves of these trees, and ultimately bury in the ground to assume the pupa stage. The Death's Head Hawk Moth and the Oleander Hawk Moth (*Acherontia atropos* and *Deilephila nerii*) are also somewhat destructive insects. The most interesting feature in connection with the butterflies is the power of mimicry possessed by many of them, either in relation to their surroundings or to other butterflies. This mimicry is of course protective, and is exercised in a striking and wonderful manner. The "Leaf" butterflies, for instance, assume the shape and form of leaves of trees, the colours of the under parts of the wings being of various shades of green and brown, such as perfectly assimilate with the prevailing colour of the leaves of the shrub or tree on which they settle, their legs being drawn up close to the body so as to be invisible. The imitation is absolutely perfection, and will defy detection of the most observant. The *Acræidæ* and *Danaidæ* are groups which are almost entirely immune from the attacks of birds, lizards, etc., owing to a certain acrid flavour and unpleasant odour which they possess. Other butterflies, particularly of the genera *Papilio* and *Pseudacræa*, which ordinarily possess no such capacity for self-protection, mimic the colours of the protected forms. Sometimes the male fly alone assumes this mimicry; in other cases both male and female imitate the respective sexes of the naturally protected forms. The horrid larvæ of *Tinea vastella* (family *Tineidæ*) are a special source of annoyance and vexation to the collector of trophies. They burrow into the horns of specimens, and soon afterwards scores of dirty grey cocoons sprout out, which when scraped off leave unsightly holes behind, and ruin the horns irretrievably.

[Note.—Always remove the horns from the bony core, and saw the latter off so as to leave only sufficient base to support the horns when replaced. Then apply preservative freely to that part of the core which remains on the skull, and to the inside of the horn itself. *Verbum sap.!*]

Lycaena parsimon.
Exp. 1 in. 6 lin.
Iolaus mimosæ.
Exp. 1 in. 2 lin.
Zeritis leroma.
Exp. 1 in. 2 lin.
Lycæna baetica.
Exp. 1 in. 2 lin.
Iolaus bowkeri.
Exp. 1 in. 4½ lin.
Zeritis orthrus.
Exp. 1 in. 3¼ lin

Order: COLEOPTERA.

This great and numerously-represented order must be treated with a brevity quite out of proportion to the magnitude of the subject. It includes many forms of the greatest interest, even to those who are not over keen

on natural history. The Burrowing Beetles, the wonderful Lamellicorns, the Sacred Scarabæus, the insidious destroyers of our most prized flowers, beetles of quaint and of hideous shape, the thousand obscurely-coloured forms that hide away in old wood, under stones, and in decaying vegetable matter, and the many gorgeously-coloured creatures that one may find in any day's ramble in suitable localities, these are far too numerous to justify an attempt at description in view of the small space now left at my disposal. Suffice it to set forth the most important orders, sub-orders, and families which are represented in this Colony.

Sub-Order : LAMELLICORNIA.

Families PASSALIDÆ, LYCANIDÆ, and SCARABÆIDÆ, LUCANIDÆ (Stag Beetles).—Sub-family MELOLONTHINÆ.—Includes some seven genera, which are very numerous in species.

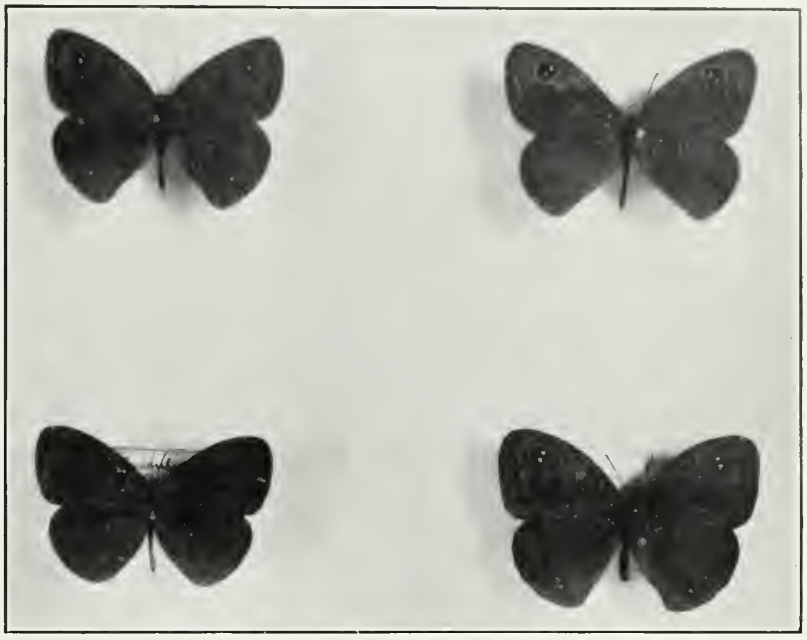
Scarabæidæ (Chafers) is an enormous group which includes such giant forms as *Heliocantharus*, and *Pachylomera femoralis*, *Sisyphus*, *Copris*, *Onthopagus*, *Onitis*, *Aphodius*, *Chalconotus*, and *Gymnopleurus* embrace together some sixty species. All are coprophagous in their habits.

Sub-family *Dynastinæ* is also represented.

Sub-Order : ADEPHAGA.

Family CICENDILIDÆ (Tiger Beetles).—These are all carnivorous ground beetles, and are referable to some five genera, with very numerous species.

Family CARABIDÆ. — Possesses some 17 peculiarly South African genera, of which probably 13 are represented in the Transvaal. One genus, *Anthia*, includes amongst its forms some of the giants of the order, *A. maxillosa*, *A. cinctipennis*, and *A. guttata*. The genera *Graphipterus*, *Drypta*, *Orthogonius*, *Amara*, *Harpalus*, *Crepidogaster*, *Hystricopus*, and *Glyphodactyla* are amongst the most important of those remaining.



Pseudonymphæ.

Family DYSTICIDÆ.—This embraces numerous genera of the Water Beetles.

Sub-Order : POLYMORPHA.

This is another sub-order with an enormous number of species. The most important families of the group are *Paussidæ*, with a few forms; *Gyrhinidæ* (Whirligigs), *Hydrophilidæ*, *Silphidæ*, *Staphylinidæ* (a most extensive family), *Histeridæ* (with eight species), *Bostrichidæ* (wood-borers, with six species), *Malachodermidæ* (including the glow-worms). *Dermestidæ* are most destructive in their larval state, *D. lardarius* being the creature which devours the skins of natural history specimens. *Cryptophagidæ*, *Ptinidæ* (whose larva is the "biscuit weevil"), and the very numerous *Coccinellidæ* (Ladybirds, with some 2,000 known species of world-wide range). This list by no means exhausts the families of this group, a list of which contains in all about 25 families. The *Elateridæ* (Fireflies) and the *Buprestidæ*, with their glowing colours, may also be mentioned.

Pseudonymphæ.

Leptoneura dingana.
Exp. 2 in.

Mycalesis safitza.
Exp. 1 in. 9 lin.

Sub-Order : HETEROMERA.

Family TENEBRIONIDÆ.—Numbers in all some 4,500 species. Amongst them are the giant beetles of the genus *Moluris*.

Sub-Order : PHYTOPHAGA.

This vast order embraces no fewer than 35,000 forms distributed over the world. The family *Cerambycidæ*, which is very numerously represented in this Colony, alone contains some 13,000 known species. The Longicorns are beetles of singular form and high development, and number amongst them some of the largest species known.

Sub-Order : EUPODA.

This sub-order is represented by many species of four families.

Sub-Order: RHYNCOPHORA.

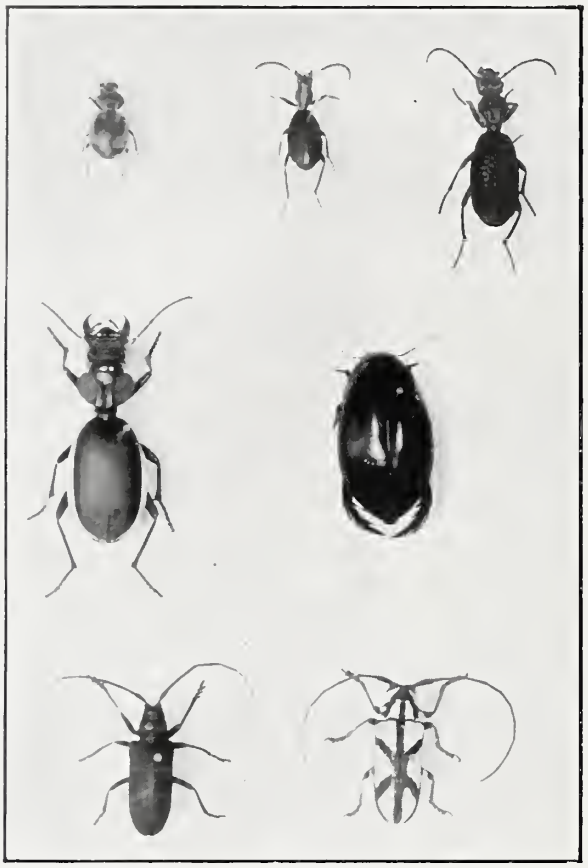
With about 25,000 known species. The family *Curculionidæ* is largely represented by forms belonging to the sub-families *Scolytinæ*, *Brenthinæ*, *Anthribinæ*. The important genera are *Brachycerus* (inhabitants of sandy desert tracts), *Episus*, *Microcerus*, *Sciobius*, and *Platycopes*.

Order: DIPTERA.

To this order belong some of our most baneful insect pests—mosquitoes, horse-flies, midges, gad-flies, house-flies, and the tsetse. The *Culicidæ* (mosquitoes, gnats, etc.) have of late come very prominently before the public in connection with the conveyance of fever germs. We have probably some twenty-three species, belonging to about ten genera, *Culex* being most numerously represented. The large Brown, the tiny Black Mosquito with plumed antennæ, and the venomous Grey Mosquito, are well-known forms. The Sand-flies or Midges are very troublesome in the Low Country and near marshy localities, and their bite is generally more painful than that of the mosquito. The genera *Elaphomyia*, *Eristalis*, and *Tipulæ* are also represented in this country. The well-known Tsetse Fly (*Glossina morsitans*) is a most insignificant-looking creature, and yet it is almost impossible to overestimate the importance of the part it has played in preventing the opening up of those countries or portions of countries where it is found. One or two other species of *Glossina* and *Stomoxys* are found in this country, but do not appear to be poisonous, or rather to carry disease germs.

Order: APTERA.

With the sub-order *Thysanura*, embraces a few forms of low organisation. They are dull, wingless insects of small size, with large and ugly heads. The genus *Smynthurus* is represented.



Graphipterus westwoodi. Piezia axillaris. Polyhirma alveolata.
A. Thoracica. Dysticus sp.
Ceroplesis hottentota. Anoplostetha lactator.

Order: ORTHOPTERA.

Includes the earwigs, cockroaches, praying insects, leaf and stick insects, grasshoppers, locusts, and crickets.

Sub-Order: CURSORIA.

Includes the *Forficulidæ* (earwigs), the blind and apterous insects of the family *Hemimeridæ; Blattidæ* (embracing those foul and most disgusting of creatures, the cockroaches, of which there are some 5,000 species in the world), and the *Mantidæ*. These latter are the well-known praying insects, or "Hottentot Gods." They are represented by several species of some six or seven genera, several of them being fantastically and even beautifully coloured. They are interesting creatures, and well repay observation, some of their movements and attitudes being irresistibly comical. They are highly predaceous and carnivorous, and slaughter enormous numbers of other insects. Many of them possess highly protective forms and colouration. If large they are capable of giving one a nasty nip between the last segments (tibia and femur) of the fore-limbs, the inner sides of which are armed with sharp teeth. The *Phasmidæ* ("Leaf" and "Stick" insects) possess even more protective forms than do the *Mantidæ*.

Sub-Order: SALTATORIA.

Family ACRIDIIDÆ. — Locusts and Grasshoppers. The locusts are only too well known, particularly the migratory forms, *Acridium purpuriferum* (the Red Locust) and *Pachytylus subsicollis* (the Brown Locust). This family also includes the form *Pucumora scutellaris*, with its wonderfully-adorned female, the singular *Xiphocera asina*, and that repulsive creation *Methone anderssoni*.

Family PHASGOMIRIDÆ.—This embraces the Green Grasshoppers, which are numerously represented.

Family GRYLLIDÆ (Crickets).—Another group, represented by some very repulsive forms (amongst them the hideous mole-cricket), all of which are predaceous and carnivorous.

Order: NEUROPTERA.

Includes the termites, stone-flies, dragon-flies, May, caddis, and scorpion-flies, lace-wings, ant-lions, and even the apterous bird-lice (*Mallophigadæ*).

Family TERMITIDÆ. — Includes the well-known form *Termes bellicosus*, commonly called the "White Ant." They are not ants at all, but neuropterous insects supposed to be distantly related to the cockroaches. They constitute one of the greatest annoyances with which people in some parts of this country have to contend. As a rule termites are not found at an altitude above about 4,500 ft., and they always avoid rocky ground and sandy soil. At the commencement of the rainy season the mature males and females take to themselves wings and leave their abode, flying forth in thousands, when they are promptly devoured by birds and certain mammals, a fate they richly deserve. If left to their own devices, however, they seldom fly any distance from their former home, but alight again, and promptly throw their wings away, and resume a terrestrial existence.

The family *Psocidæ* includes the "Death-watch" and the Booklice.

Family ODONATA.—Includes the dragon-flies, creatures of exquisite shape and brilliant colouration. They form swarms and migrate. They are referable to the following sub-families: —*Gomphinæ*, *Æschninæ*, *Corduliinæ*, *Libellulinæ*, *Calepterygina*, and *Agrioninæ*.

Family EPHEMERIDÆ.—There are many species in this country, usually of delicate and fairy-like form, but soberly coloured.

Family PANOPIDÆ (Scorpion-flies).

Family HEMEROBIIDÆ.—With five or six represented sub-families, including *Chrysopidinæ*, the beautiful lace-wings, some very handsome *Palpares*, and the voracious Ant-lion of the sub-family *Myrmeleonides*.

Family PHRYGANEIDÆ (Caddis-flies).

Order: HYMENOPTERA.

Includes the ants, bees, wasps, saw-flies, ichneumon-flies, belonging to some ten or twelve thousand named species, or about one-half of the probable existing forms, which may be reckoned at some 25,000 or 30,000.

Sub-Order: DIPLOPTERA.

Family MASARIDÆ.—Contains the singular Masarids, or Earth Wasps. I have only met with them near Pilgrim's Rest, in the Lydenburg district.

Sub-Order: FOSSORES.

Family SCOLIIDÆ.—Includes a most repulsive and venomous creature, *Scolius*, which abounds in the wet season, and attracted by the light enters houses in large numbers. They are yellow-brown in colour, have long flexible bodies, and a most vicious sting in the tail.

Family POMPILIDÆ.—This and the following group is very numerously represented. The former are known as Tarantula-Killers. They are really the Carpenter Wasps and Bees (*Sphegidæ*). The former have indigo-coloured wings, black and orange legs, and yellow abdomen. The latter have velvety-black bodies and violet wings. They are highly predaceous, and, as they kill enormous numbers of spiders and other equally hateful creatures, are quite useful insects. They are armed with fearful stings, but nothing ever seems to induce them to use them upon human beings. They have a singular custom in connection with providing for an expected family. They attack a spider, for instance, the effect of their sting being that the prey is benumbed; they then carry it off to their nests, and plaster it up in one of the cells, in which cell the female deposits an egg. The larva hatches out and finds the benumbed but still live creature in the cell, upon which it regales itself until such time as it can break its way out, when it emerges in the form of the perfect insect.

The Honey-bee (*Apidæ*) is common in the Transvaal, and we have probably three or four species of *Xylocopa*, the males of which are usually bright orange yellow and the females dull black.

Sub-Order: FORMICIDÆ.

Embraces the ants, amongst which the giant *Ponerids* are represented. The Transvaal has its fair share of ants, from the huge Black Ponerid, which can bite most cruelly, to the tiny creature that crawls into one's food, and the larger Reddish Brown Ant that is particularly partial to sugar. There is also a Red Tree Ant, with a most venomous bite, and the little insignificant brown fellows that inhabit decayed wood, and attack like furies, if one climbs a tree in which is a decayed limb inhabited by these wretches. They turn their tails over their backs like scorpions when in the act of stinging. We also have a Harvesting Ant of the genus *Aphænogaster*.

The whole entomological section, as well as that treating of the *Reptilia*, have been most undeservedly but unavoidably curtailed, but it must be borne in mind that had all been said which could be said within ordinary limits it would not have anything like exhausted the subject, which offers a wide and interesting field for further careful study and research.

The Transvaal Zoological Gardens.

SIX years subsequent to the establishment of the Pretoria Museum application was made by the Director to the Committee of that institution for permission to purchase the few live animals and birds, which from time to time were brought to the Museum for mounting purposes, but which at the time of their arrival were not in sufficiently good or healthy condition to make satisfactory specimens. The idea was that a small sum might be expended in providing them with food and cage room until such time as they regained their health, and with it their wonted natural appearance. Permission was granted, and a sum of 3s. per diem was "ear-marked" for the purpose. From these small beginnings the birth of the present fine zoological collection in the Gardens at Pretoria is easily traced. The numbers of specimens then brought in steadily increased, and, as the humanity of the Director would not permit him to con-

Main Entrance to the Transvaal Zoological Gardens, Boom-street, Pretoria.

sider that these live creatures ever attained sufficient health and beauty of form and plumage to warrant him in killing them, the grant was increased

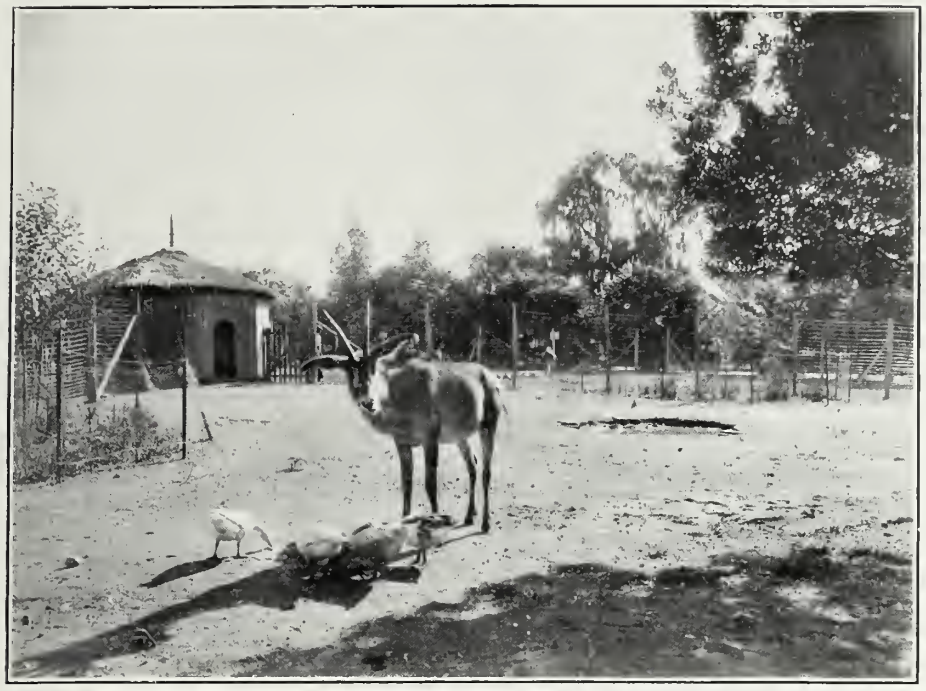
MAIN AVENUE IN THE GARDENS.

to 5s. and later on to 10s. per diem. Representations were then made that it was a pity to destroy the creatures thus nurtured, merely for the purpose of filling show cases in the Museum, and on an appeal being made for funds to assist in preserving them alive, it met with hearty response. So hearty, indeed, was this response that the Committee was enabled to purchase other specimens with the funds in hand, and thus the Transvaal Zoological Gardens came into existence. The

Red-and-Blue Macaw (South America).

collection at this time consisted of two owls, about thirty finches, three baboons, a monkey, a steinbuck, two suricates, a llama, a kangaroo which had been cast by an itinerant circus, a varanus lizard, and a puff-adder. A further sum of £45 was then subscribed in Pretoria, followed by a grant of £500 from the South African Republic Railway Company. The Director was now in a position to increase the number of specimens in his collection to such an extent that the space at the back of the old Museum building on the Market Square, which had an area of little over 20 square yards, was insufficient to accommodate them, in addition to which residents in the Square objected to the noise and smell. This was a critical time in the life of this Pretoria fledgling: the Director had no funds wherewith to purchase land, and the Government of the South African Republic refused assistance. Fortunately the then Director of Education, who was the Chairman of the Museum Committee, came to the rescue, and placed a piece of waste land, of which in his official capacity he had the charge, at the disposal of the Director. Thither the collection was removed and has since remained. After the British occupation of Pretoria, Lord Roberts, Lord Kitchener, and Sir John Maxwell (Military Governor of Pretoria) became greatly interested in the Gardens, and the new Government liberally contributed to their support. From that period to the present the institution has grown continuously; substantial sheds and camps have been provided for the various animals, a new monkey-house and eagles' aviary have been added, and another large aviary accommodating some 500 birds was erected at a cost of about £1,200. This aviary was formally opened on December 15th, 1904. The Zoological Gardens have now become one of the most popular resorts in the Transvaal. Their attractions are particularly appreciated on Sundays, when a band plays during the afternoon and evening throughout the year. The grounds are also frequently used for official receptions and garden parties. The Gardens are under the control of the Committee of Management of the Museum. The staff consists of a director, superintendent, bookkeeper, a head and an assistant gardener, a head keeper and three assistants, a gatekeeper, blacksmith, and carpenter. The revenue collected from all sources during the financial year ending June 30th, 1905, and including a grant of £5,000 from the Government, amounted to £11,311 17s. 10d. At the commencement of 1906 the number of mammals living, or having lived in the Zoological Gardens since their commencement in 1899, was 1,557, and of birds 5,086. The number of paying visitors to the Gardens during that period averaged 18,000 monthly. The area of the Gardens, including a piece of ground 13 morgen in extent, granted by the Government during the year, comprises nearly 31 morgen. There is one thing which above all others strikes the visitor to these Gardens, namely, the extraordinarily good health enjoyed by the various animals and birds in the collection. Of course sickness does and will occur: this is unavoidable where the number of specimens from all parts of the world attains such

Sulphur-crested Cockatoo.

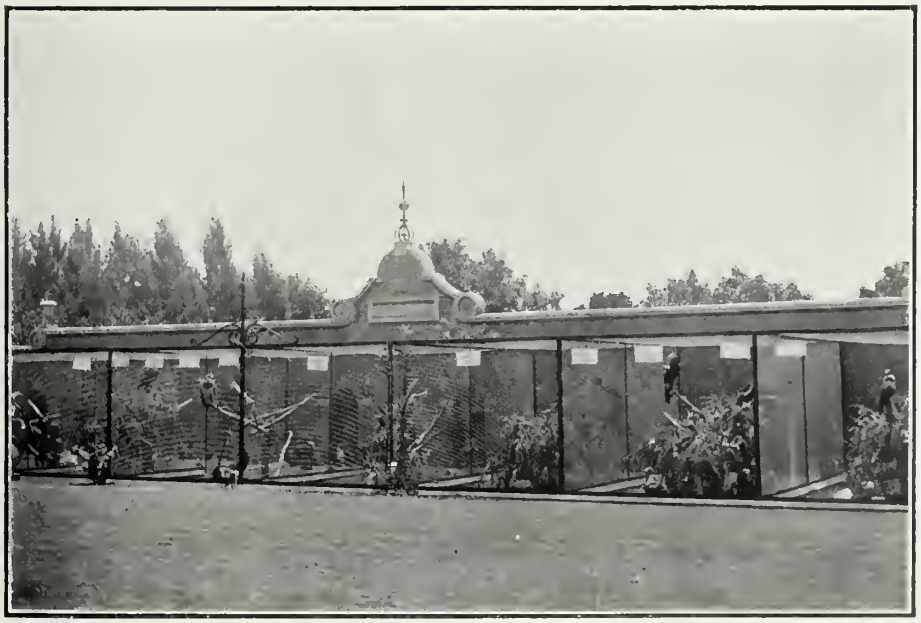


Roan Antelope in the Gardens.

dimensions as in the present case. But the utmost care is exercised in dealing with the animals, and prompt measures are taken in cases of sickness. The result is that in the main all the interesting exhibits which the Gardens contain are apparently in the enjoyment of perfect health. And this is to some extent rather surprising, seeing that many of the animals and birds occupy absurdly small quarters. The providing of more roomy cages and houses will of course come in time. The institution has been singularly fortunate in the increase of its collection by natural means. During the year 1904-5 no fewer than 38 young animals were born; of these only nine are African forms. During that period, also, 58 mammals were presented to the Gardens, amongst the most important being an Indian tiger by the Right Honourable Lord Curzon, three galagos, an aard-wolf, two giraffes, two scaly ant-eaters (*Manis*), and a ratel. In addition to these, no fewer than 79 specimens were acquired by purchase, the following being a complete list:—

2 Entellus Monkeys
3 Macaques
1 Brown Lemur
1 Puma
2 Aard Wolves
1 Dasyure
2 Yellow Mungooses
1 Blesbuck
1 Mountain Reedbuck
1 Bushbuck
1 Somali Bull
1 Mountain Zebra
1 Porcupine
3 Vervets
6 Bonnet Monkeys
3 Galagos
2 Caracals
1 Black-backed Jackal
1 African Polecat
1 Duiker
5 Springbuck
1 Himalayan Thar
1 Zebra
1 Brown Squirrel
1 Opossum
1 Samango
1 Chacma Baboon
8 Ring-tailed Lemurs
2 Brown Hyænas
2 Fennecs
1 Black Mungoose
1 Sea Lion
3 Steinbuck
2 Indian Black Buck
3 Indian Water Buffalo
2 Yaks
2 Beaver Rats

Scene in the Transvaal Zoological Gardens, Pretoria.



EAGLE AVIARY.

No fewer than 1,211 birds were, during this period, acquired either by purchase or presentation. Up to June 30th, 1904, a total of 1,494 mammals and 5,032 birds either had lived or were still living in the Gardens. The financial position of the institution is quite sound, although the expenses, as may be expected, are considerable. During the financial year ending June 30th, 1905, the largest item, next to the Government grant of £5,000, under the head of receipts, was £4,383 0s. 6d. for admission tickets. A sum of £594 was realised by subscriptions, while the

sale of animals and plants realised £351 17s. 5d. and £265 9s. 3d. respectively. Under the head of expenditure, salaries of white officials accounted for £2,503 10s., and wages of native attendants £1,580 17s. 3d. The cost of the food for the upkeep of the animals was £2,200 11s. 2d., and the band account reached £1,208 9s. 6d. A sum of £874 13s. 2d. was expended in the purchase of animals.

An Avenue in the Gardens.

Having thus given a short history of this popular institution, and some details of its working, the writer will proceed to conduct his readers in imagination through the Gardens, pointing out on the way such exhibits as seem to call for special attention. We will suppose the Visitor leaves the Museum building by the general exit into Boom-street, when a walk of a few yards in the direction of Market-street brings him to the lodge gates of the Zoological Gardens. Entering by these

Wildfowl Pond and Stanley Cranes.

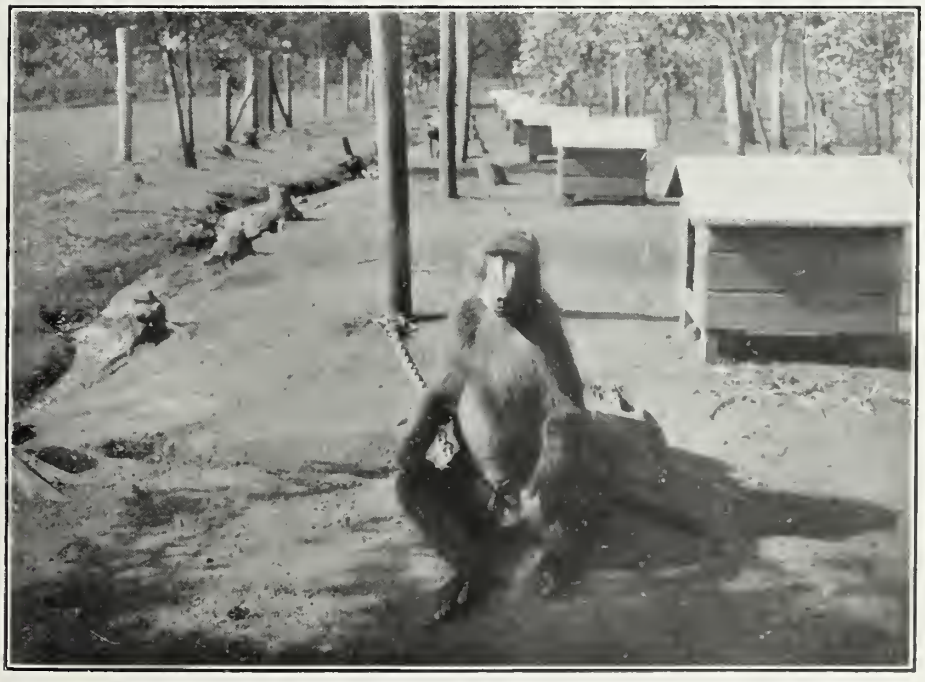
Swans in Wildfowl Pond.

he is confronted by the main avenue of the Gardens, running south and north, which is delightfully shaded by silver oaks, while the beds on either side are gay with variegated shrubs and flowering plants. In fact one does not require to penetrate very far amongst the winding walks, tree-embowered and cool, and the tastefully-laid-out beds of flowers, before becoming quite convinced that both care and energy have been devoted to making the place as perfect of its kind as circumstances would admit. With regard to the general arrangement of the animals, and in reply to the writer's query on this subject, the Director courteously pointed out that there could scarcely be said to be any organised plan, owing to the fact that the area which comprises the present Gardens has been acquired piece by piece, and from time to time, just as the urgent necessity for further accommodation for the increasing number of specimens arose. So that, with the exception of the one long main avenue and two more or less definitely-laid-out cross paths, the Gardens may be described as being planned on the principle of landscape gardening, presenting all manner of surprises in the way of dainty paths winding amongst shrubs, flowers, and grasses, cool shaded paths under over-arching boughs, and occasional vistas of a nature that reminds one of the open forest in the far interior. Dotted about here and there amongst the trees are enclosures and cages containing the various specimens, so placed that one never knows but that at each turn of the path something of interest may arrest attention. From the point of view of the lay mind this

THE LEOPARD AND HYÆNA CAGES.

arrangement—or rather, want of it—is possibly desirable, presenting, as it does, so many surprises for the visitor, though the need for more definite grouping is apparent to those whose interest in the animals partakes of a scientific nature. But, indeed, it is splitting hairs to even suggest improvements, so evident is it that throughout the whole scheme the management has had almost insuperable difficulties to contend with, and yet has accomplished the task with a completeness and success which are their own reward. The plan which it is proposed to follow in conducting the reader round the Gardens is to bear at once to the left on entering, and work off the south-west angle formed by the main avenue and the principal cross path, then to take the south-east angle in a similar way, and, crossing the above-mentioned path, to cover the north-east angle, finally re-crossing the avenue and taking the north-west angle. In pursuance of this plan, then, the first object that attracts one's attention is a particularly ugly but apparently good-tempered Sphinx baboon, a creature rendered far uglier even than the familiar "Jacko" by reason of the peculiar swellings on the nasals. In other respects the animals are very similar, and this specimen of Sphinx is a particularly good one. Passing by a cage containing an Australian rock wallaby on the left, and on the right a series of out-door perches with the familiar red-and-blue and blue-and-yellow macaws and sulphur-crested cockatoos in occupation, we arrived at an aviary about 50 ft. in length and 10 ft. high, divided off into five sections. The first two of these contain a lively collection of small birds, including English thrushes, blackbirds, linnets, siskins, and chaffinches, Java sparrows, and innumerable African birds, finches, weavers, waxbills, widow-birds, sparrows, canaries, thrushes, and doves. The third section contains good specimens of the Australian laughing jackass, the African black raven, and the white-necked crow. In the fourth section are some Indian, South American, and Australian parrakeets, and in the fifth a collection of cockatoos and macaws. Standing apart from, and a little beyond the aviary, is a cage containing a pair of beautiful "Chinchilla" cats, which are lovely creatures, very like Persians, with silky coats of a blue-grey colour. Further on are some young rock pythons in glass-fronted cases, looking, after the manner of their kind, repulsive and slothful to a degree. They have to be fed upon live animals—rats, etc. Very few snakes, indeed, will accept dead food. Near by we find a number of cages containing some small insectivores and rodents. Amongst these that quaint creature called the Cape mole rat (*Georychus hottentotus*) deserves close attention, if he will condescend to show himself. Their habits are fossorial, and they are distinctly partial to sandy localities. The visitor is now confronted by a quick-set hedge which divides the Gardens from the private house occupied by the Director and the spacious grounds attached thereto. Along this hedge a long series of detached cages are placed. The first contains as magnificent a pair of caracals (African red lynx) as may be seen in any collection in the world. In perfect

THE "FLYING" AVIARY.



BABOON ENCLOSURE.

health, and in the prime of life, their sleek red fur shines like satin, and the avidity with which they devour their food testifies to the fact that their appetites are no more affected by captivity than is their health. And yet they are not loveable; always savage by nature, their ferocity seems to have increased in captivity, and they snarl and growl in a manner that would put even a leopard to shame. In strange contrast to this pair of furies is a beautiful male puma which occupies the next cage. Full of fun, playful as a kitten, and quite as docile, the fine animal is a popular favourite, and will allow anyone to fondle him. He evidently enjoys the best of health, and is in splendid condition. Next door is a huge bundle of black fur, from which a strongly-marked canine snout at times protrudes, when one

The Zebra Enclosure.

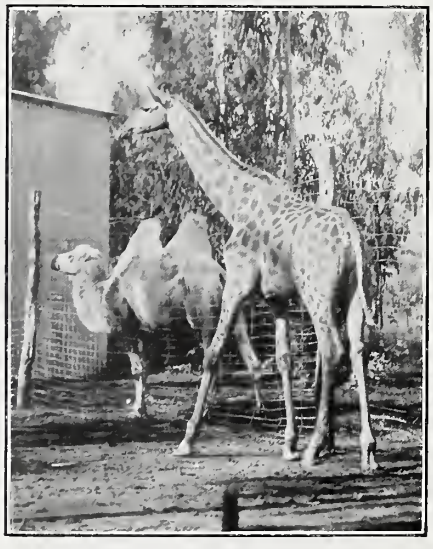
the visitor reaches a large enclosure, more or less circular in shape, divided off into five camps. In the first is a fine young roan antelope, and a number of Griffon vultures. The camp is a large one, and the lucky captive has quite an extensive area of green grass with which to supplement his ordinary dry fodder. In the next camp are some moufflous (mountain sheep), with young, and in the next division some Himalayan thar, also with young, bred in the Gardens. In the next paddock are some impala (the springbuck of the Low Veld), bushbuck, a young sable antelope, and some peafowl. The fifth camp contains a fine young sable antelope bull. Still proceeding in the direction of the main avenue, one comes to some divided enclosures containing on the one side specimens of the great grey kangaroo from Australia, and of the nail-tailed wallaby. On the other side is quartered a good specimen of that most grotesque and ugly creature the wart-hog. His tusks are but poorly developed, but nevertheless he has an

Interior of the Conservatory.

THE CONSERVATORY.

Date Palm in the Zoological Gardens.

realises that this formless-looking creature is a Himalayan sloth bear. He lies on his back most of his time, and on the whole appears to take life easily. Further on, along the hedge, are cages containing Australian phalangers, and some ferocious little African bush cats (*F. nigripes*), whose angry snarls are out of all comparison with the insignificant size of their bodies. Other cages contain healthy-looking hyraces, some of them very well-grown specimens. There are also three handsome Xerus ground squirrels, lively little creatures whose inquisitive habits and active movements have attracted the attention of everyone who has visited the Bush Veld, where they are exceedingly numerous. Passing other cages of hyraces, and bearing to the right,



Giraffe and Camel Enclosures.

evil reputation and a violent temper. To the left, the visitor enters a beautifully cool shady walk, embowered in trees (silver oaks and syringas), where are cages of kangaroo rats—vicious-looking beasts they are too—and nearly opposite them a row of small cages which do duty as the owls' aviary. The collection contains Verreaux' eagle owl, the great spotted eagle owl, Woodford's owl, the scops-eared owl, the pearl-spotted owlet, the barred owlet, and an interesting group of *Strix flammea* of different ages, and showing the various corresponding changes of plumage. Near by is an enclosure containing young crocodile and some black turtles, and beyond this two cages of Australian wombats. The dividing hedge is now reached

again, where one finds rows of cages displaying a collection of viverrine mammals, including a European ferret, several mungooses of different species —amongst them the black mungoose (*Herpestes galera*)—the suricate, or mierkat, the African polecat, and a number of genets. Beyond these lies the eagles' aviary, a fine structure, in each compartment of which willow stumps are planted; most of these are throwing out branches and leaves, thus affording good shelter for the occupants. There are eight cages in all, and the principal forms therein displayed are the South African condor, the eared-griffon, red-hooded Brazilian vultures, Chilian sea-eagle, Bateleur eagle, Brazilian cara-cara, a magnificent pair of crowned hawk eagles, a martial eagle (a particularly fine bird), Verreaux', the tawny, and the wedge-tailed eagles, Wahlberg's eagle, marsh harriers, lanner falcons, kestrels, and yellow-billed kite. The extensive wildfowl enclosures and ponds next claim attention. The visitor would do well to arrange his inspection for the early morning or late evening, when all the birds have left the cover of the bamboo brakes and other vegetation in which they shelter during the heat of the day. Amongst other birds, the first enclosure contains black-and-white swans, spur-winged and Egyptian geese, Australian magpie goose, Cape Barron goose, Australian black duck, teal, Muscovy ducks, and a number of gallinules. These latter frequently fly outside, and roam about the Gardens at will. The second enclosure contains Canadian and Cape Barron geese, Mandarin duck, gallinules, Stanley cranes, and black-headed heron. The fence of this enclosure is set well back from the banks, which are covered with vegetation, amongst which are a South American capybara, a pair of oribi, two duikers, and a steinbuck, while on the island a sloth bear is tethered. Within this enclosure are cages containing opossums, galagos, and fennec foxes. By a convenient arrangement the pools are supplied with fresh water from the furrow in the street, and the waste water after passing through the ponds is utilised for the irrigation of the trees situated below. Retracing his steps now to the entrance, the visitor crosses the avenue and takes the exhibits in the south-east corner. Here stands the new monkey-house, a building about 35 ft. long, containing six cages, in front of which is a covered glass-fronted verandah. The types exhibited are the rare samango—a very handsome specimen from Pondoland—a black-faced monkey, a pair of pretty Sykes' monkeys, two macaques, vervets and capuchin monkeys, and bonnet and Bengal monkeys from India. The black-faced monkey is a most handsome beast, jet black in colour except for a silver-grey saddle on the back and loins, and a grey-black head and face. Near to the monkey-house, and against the dividing hedge between the Gardens and the Museum, is a Himalayan bear. Placed amongst trees and flower-bordered sidewalks are cages containing European badgers and the singular honey badger or ratel of this country, also others containing grey and black phalangers from Australia. Proceeding further, an octagonal stone and iron enclosure is reached where the leopards and hyænas are housed. Both the spotted and brown hyænas are represented, and there is a particularly handsome pair of leopards, while two cubs disport themselves in the adjoining compartment. A male puma has a cage to itself, also a Himalayan bear, while the last compartment contains a cheeta and a baboon. Singular playmates; yet they seem to understand each other very well, and are quite good friends. Away on the right the Gardens extend some distance at the back of the Museum building, and here are found enclosures with European roe deer, a young black wildebeeste, and some Indian blackbuck with young. Thence the visitor proceeds to the great flying-aviary, a very handsome structure built entirely of iron. The general scheme of this aviary is that it shall form a bit of nature—rocks and undergrowth, loam soil and gravel, trees, grasses, and bamboos, and streams of water meandering through it and forming little pools here and there. That this idea has been entirely carried out is not surprising, seeing that the dimensions of the structure is as follows:—total length, 124 ft.; width, 36 ft.; height, 45 ft. The centre forms a large arch, 15 ft. in height and 15 ft. in width, under which runs a promenade path. It can be well understood that in such a place the birds are enabled to indulge in their nesting proclivities: parrots build high up in the arch, and waxbills and weaver birds on branches and bamboo stems. It is in the writer's opinion quite the best thing in the Gardens, and to anyone fond of bird life is a place difficult to tear oneself away from.

Indian Tiger

(presented to the Gardens by Lady [illegible] Lawley).

The Tiger roused.

Amongst other inhabitants of this regal birdcage are hundreds of finches, weavers, and widow-birds, parrots, egrets, crowned cranes, turacos, Himalayan kaleege, Australian diamond doves, crowned pigeons, moorhens, sandpipers, turtle doves, Reeves' and Amherst pheasants, golden pheasants from China, crested and common guinea-fowl, night herons, European pheasants, bulbuls, Senegal and laughing doves, pochards, speckled pigeons, Namaqua doves, and bronze wing pigeons. There are also rough and leopard tortoises, and the common

geometric tortoise. Beyond the aviary are the rhea sheds. Crossing the promenade, where are some cages containing mungooses and a handsome

skirts the above-mentioned camps. In many places round these camps, young oak trees have been planted and are thriving. These will eventually pro-

INDIAN BUFFALOES. WILDEBEESTE ENCLOSURE. HIMALAYAN YAKS.

Caffer cat (whose education in the way of manners has been neglected), and entering the north-east angle of the Gardens, one comes to the baboons' enclosure, where there is quite a good show of various species of these creatures, each with his box and pole. This enclosure is separated by a low hedge from four enclosures, the first containing mountain reedbuck, duiker, msumbi, and the interesting Harvey's duiker; the second enclosing the grotesque Marabu stork (a clown amongst birds, one would think, on watching the ungainly form, the monstrous beak and pendant sac, and the absolutely idiotic postures assumed by him, differing vastly from the sedate and dignified air which he sports in the Veld). The third enclosure contains the four-horned antelope, and the last the Indian muntjac deer. A path divides these enclosures from another series of camps, in which are Stanley and Bell cranes, storks, and secretary birds; Indian hog deer with young, European red deer with young, sambur, Axis deer with young, fallow deer with young, and Japanese sika deer. The ostrich enclosure is on the opposite side of the path which

vide the most perfect shade possible for the animals—the eucalyptus being quite a failure in this respect. Skirting the deer enclosures, the visitor will now reach the double cage containing an Indian tiger and tigress, one presented by Lord Curzon, and the other by Lady Lawley. The former is a truly magnificent specimen, in perfect coat, but very irritable and savage. The latter was born in captivity, and was four years old on the 3rd September, 1905. Just below the deer sheds stands also the lion house, facing north. It was erected at a cost of £1,200. It contains a lioness, some bears, and a Bengal tigress. The lioness, as is well known, is an animal with a history. After the stirring events of the Jameson Raid, this lioness—then a cub in the late Mr. C. J. Rhodes's collection at Groot Schuur, Capetown—was secured by the Director of the Gardens for the Pretoria collection, and in due course it arrived in the capital. It required very little in those days to incense the worthy President of the Republic against Mr. Rhodes and everything that was British, and when some wag suggested that the British Lion had reached Pretoria, and added that "Coming events cast their shadows before," it is needless to state that the unfortunate lioness was quickly hustled out of the country and back to Capetown. The tips of the poor beast's ears are clipped, and history has it that this was done in Pretoria before it was sent away; but the Director of the Museum informed the writer that it was under his charge during the whole period of its tarry in Pretoria, and had the story been true he would have known it: he is certain, however, that there is no truth in it. The lioness was subsequently purchased, and is now one of the most interesting exhibits in the Gardens. She is a beautiful beast, sleek and well-conditioned, and very tame. In the evenings and in wet weather her deep musical voice can be heard at long distances. Near to the tigers are a number of Indian cattle, comfortably quartered in a forest of blue gums. Still keeping in the same direction, and leaving the fine conservatory on the left, a row of paddocks is reached, occupied by the emus, camels, llamas (with young), giraffe, zebras, nylgai (with young), and eland. There are now two fine young giraffes in the Gardens, and good specimens of the mountain and Burchell's zebra. The six young eland, unfortunately, are only deposited temporarily. In front of these enclosures are pens containing Australian dingos. African hunting dogs, an aard wolf, a European fox, and black-backed jackals.

The conservatory is a building 104 ft. in length, 50 ft. wide in the middle, and 30 ft. in height, and is constructed in three divisions. It was erected at a cost of a little over £2,000. It contains, in addition to the ordinary ornamental plants, Calladiums and Dracœnas, many tree-ferns from the Barberton and Zoutpansberg districts, about two hundred different varieties of ferns, two hundred varieties of orchids, and many palms and other ornamental plants. The walks in front of the conservatory are prettily laid out amongst beds bordered with camphor trees, and present a rich display of colour, derived from the many flowering shrubs which grow here in profusion. Near to the conservatory are enclosures containing springbuck and blesbuck, and others with kangaroos and wallabies.

Below the conservatory is a large area of waste land which the energetic Director proposes turning into a huge artificial lake, with promontories extending far into it, and islands dotting the surface. The situation is a beau-

tiful one, and the general effect when completed will be unquestionably fine. The main avenue is now re-crossed, and the visitor will do well to pay a visit to the refreshment rooms, under the shade of the lofty gums. Chairs and seats innumerable are set out here under the trees, the space being lighted at night, if necessary, by electricity. Here the band plays each Sunday afternoon and evening, and one can readily understand that the *tout ensemble* would form a most gay and impressive scene. On the vacant ground to the south the management intends erecting a first-class band-stand. Before leaving this spot the visitor should walk over to the cages containing those interesting creatures the lemurs and coatimundis, of which there is a good collection. Thence passing along under the trees in a westerly direction, the last series of enclosures is reached. These contain a pair of Indian buffalo, a pair of yaks, some white-tailed gnus (black wildebeeste), and a magnificent specimen of the American buffaloes. The latter, one regrets to note, is only on loan. He is a stately beast, very quiet and dignified, and shows no sign of ill-temper.

Blesbuck enclosure, showing Animals with young.

An Indian elephant, presented to the Zoological Gardens by Mr. S. Marks, arrived at the end of February, 1906. The animal, which is about seven or eight years old, was caught in Rangoon, and is well trained. Needless to add, it is a great attraction to visitors to the Gardens.

The principal ornamental trees in the Gardens are Silky Oaks (*Grevillia robusta*), Beef-woods, Black-woods, Black Wattles, several varieties of Eucalyptus, Lawson's Cypress, Microcarpa, American and European Oaks, Silver Wattles, and many ornamental shrubs. Two large beds of South African bulbs, most of which were presented by Lady Innes, form a special feature of the botanical collection.

Game Preservation in the Transvaal.

THE history of game preservation in the Transvaal dates back to the year 1892. Prior to that period, Mr. Vaughan Kirby, together with two well-known sportsmen and personal friends—Mr. H. T. Glynn, of Sabi, and his brother, the late Mr. J. W. Glynn—took up the matter very strongly in the public press, at the same time petitioning the Government of the South African Republic to formulate a scheme whereby some restraint could be placed upon the indiscriminate slaughter of game, and a sanctuary be provided wherein herbivorous animals could be wholly protected. The agitation was for a long time unsuccessful, but ultimately, as the indirect result of the representations made, the Game Law of 1892 came into existence. Under its provisions a reserved area was proclaimed, embracing the country between the Sabi River on the north, the Crocodile River on the south, the Lebombo Mountains on the east, and on the west an imaginary line drawn from the junction of the Insikazi River, through Pretorius Kop (or the Manungu), to the junction of the North Sand River with the Sabi. A gamekeeper ("jacht-opziener") was appointed, but no onerous restrictions were placed upon those who, for any good and valid reason, wished to enter or pass through the Reserve, whilst accredited parties were always permitted to shoot carnivorous animals therein. The late Capt. Francis and his brother, with Mr. Vaughan Kirby, and others, used to visit the Reserve every winter for the purpose of shooting lions, and were almost invariably successful in securing good bags of these animals. The Game Law further provided for the complete protection of rhinoceros, eland, buffalo, hippopotami, and (subsequently) giraffe and ostrich. The animals then fairly numerous in the Low Country, here given in the order of their occurrence, were: (1) Grey duiker, (2) bushbuck, (3) steinbuck, (4) reedbuck, (5) impala, (6) waterbuck, (7) brindled gnu, (8) Burchell's zebra, (9) sable antelope, (10) kudu, (11) tsessebe, (12) bushpig, (13) warthog, (14) klipspringer, (15) mountain reedbuck, (16) red duiker, (17) grysbuck, (18) giraffe, (19) roan antelope, (20) eland, (21) hippopotami, (22) buffalo, (23) rhinoceros. Lions were numerous in the reserved area, and in such places as the Simana Kopjes, Timbabati River, and the Malau, Vimbangwenya, and Ridsolo rivers. Other carnivorous creatures were numerous: for it must be remembered that in those days sportsmen used the rifle, and seldom or never attempted trapping. The lions, however, were "kept in hand" to such an extent that they never approached the vicinity of the foothills, and had entirely left the neighbourhood of Pretorius Kop, the Rij Kopjes, and the Mehlamhali, or Sand River. Elephants very occasionally came into the Transvaal from Portuguese territory up to about the year 1896. Ostriches were fairly plentiful. The game birds in the order of their occurrence were: Francolins (*Pternister* and *Francolinus*), common guinea-fowl, bustards, bush quails, or hemipodes (*Turnix*), sand grouse, and kori bustard. The system adopted involved very little, if any, extra expenditure, the "jacht-opziener" being also District Native Commissioner, and in the performance of these duties constantly patrolling the country with his native police. Owing to one cause or another, however, the full benefits of the scheme were not realised, though the game in the Reserve rapidly increased. Ultimately the rinderpest appeared—about 1896–7—and destroyed enormous numbers of game, the Tragelaphine antelopes and the Bovinæ being the heaviest sufferers. This epidemic was followed by the period of hostilities, during which all official control was lost, and a large proportion of such game as had escaped the rinderpest was destroyed. When, finally, the British flag flew in Pretoria, the Government took up the matter of game preservation in earnest, and before the end of 1902 the first Game Preservation Ordinance under its administration (No. 29 of 1902) came into force. Under its provisions the Lieutenant-Governor was empowered, from time to time, by proclamation in the *Gazette*, to fix a close season for the Colony, or any district, or portion of a district thereof; to prescribe a list of birds and animals which should be protected for a given period; to define reserves wherein it should not be lawful to destroy game; and penalties were provided under the Ordinance for the sale or destruction of game during the close season, for the destruction of game protected by proclamation or in the reserves, for the destruction or sale of game without a licence, and for contravention of the conditions of any shooting or "sale" licence. The Ordinance also provided for the right of an owner or lessee to shoot game on his own property without a licence, or to destroy any game thereon which might be causing damage to trees or crops. This Ordinance was followed by the Game Preservation Amendment Ordinance of 1903, and later by the Game Preservation Ordinance, No. 6 of 1905, whereby the former Ordinance (No. 29 of 1902) and the Amended Ordinance of 1903 were repealed. This later Ordinance was passed in Council on September 4th, 1905, and received the assent of His Excellency the High Commissioner on September 8th. Under its provisions several alterations and additions were made in connection with the sections of the former Ordinances, dealing with snaring and trapping game, the shooting of game for sale and the sale of game in the close season; penalties for hunting game protected by proclamation, or in reserve areas, and for shooting or selling game without a licence; the classes of licences; and the rights of owners, &c., to hunt game upon their own land, without a licence, under certain conditions. Section 10, dealing with this latter subject, reads thus:—"It shall be lawful (a) for the owner or lessee of land, not being a native

"Bridal Veil" Falls, Sabi River.

resident on Crown land, or in a location or native reserve, or upon land used as a mission station, during the open season to hunt game (other than big game) upon such land without a licence, and to sell game hunted upon such land (other than big game) without a sale licence; (b) for the owner, occupier, or cultivator of land, to destroy game thereon which is causing damage to trees, plants, or standing crops; (c) for the person authorised to hunt game for scientific purposes under regulations mentioned in Section 4 to hunt such game as may be named in the permit issued to him." Further useful legislation was embodied in two sections dealing with the taking of young of wild ostriches and ostrich eggs, and with the export duty on ostriches and ostrich eggs. Under the first of these sections, it became lawful for the Commissioner of Lands, in his discretion, to grant permission in writing to any person to capture the young of wild ostriches upon Crown land, or to take the eggs of ostriches; and the owner or lessee of any private land might in relation to such land exercise the same powers, subject to similar regulations. The second of these two sections provides for a duty of £100 upon every ostrich and £5 upon every ostrich egg exported from the Colony. "No such duty shall be payable, however, on such export to any colony or territory in South Africa, if by the law of such Colony or territory a duty is payable on the export therefrom of ostriches or ostrich eggs respectively not less in amount than the duties imposed by this section." Sub-section 2 provides a fine not exceeding £200 for every ostrich and £25 for every ostrich egg, for contravention of the law, upon conviction of the offender. Another section deals with the nature of evidence against a person accused of contravening the Ordinance. Certain periods of imprisonment are provided for in default of payment of penalties, and provision is made for an amendment of the Arms and Ammunition Ordinance for the benefit of wardens or rangers of any reserve established under this Ordinance.

The following schedule provides, in Part I., a list of game which may be shot in the open season on payment of a £3 licence, and in Part II. a list of wholly protected game. (At the time of writing the licence had been fixed at £1 10s. for the season commencing April 13th and ending August 31st, 1906.) The writer has taken the liberty of removing the Dikkop from the list of francolins, and of leaving out the Quagga, which is extinct in South Africa, and never was indigenous in the Transvaal:—

PART I.

FRANCOLINS—

Red-billed francolin
Noisy francolin
Natal francolin
Pileated francolin
Grey wing francolin
Le Vaillant's francolin
Orange River francolin
Coqui francolin
Swainson's francolin
Red-necked francolin

GUINEAFOWL—

Crowned guineafowl
Blue-headed guineafowl

BUSTARDS—

Kori bustard
Stanley bustard
Ludwig's bustard
Blue bustard
Senegal bustard
Black-bellied bustard
African black bustard
White-quilled bustard

PLOVERS—

Dikkop

GROUSE—

Namaqua sandgrouse
Double-banded sandgrouse
Yellow-throated sandgrouse
Variegated sandgrouse

WILD GEESE—

Spurwinged goose
Egyptian goose
African dwarf goose

ANTELOPES—

Blesbuck
Duiker
Red duiker
Klipspringer
Oribi
Steinbuck
Grysbuck
Waterbuck
Reedbuck
Rooi rhebuck
Vaal rhebuck
Impala
Springbuck
Bushbuck

WILD DUCK—

White-masked duck
Knob-billed duck
South African shell duck
Red-billed teal
Yellow-billed teal
Black duck
Hottentot teal
Cape teal
Cape shoveller
South African pochard
White-backed duck
Maccoa duck

HARES—

Cape hare
Rock hare
Red hare

WILD PIG—

Bushpig
Warthog

PART II.

Elephant
Hippopotamus
Buffalo
Eland
Giraffe
Kudu
Hartebeest (red)
Hartebeest (Lichtenstein)
Tsessebe
Rhinoceros
Zebra
Roan antelope
Sable antelope
Wildebeest (blue)
Wildebeest (black)
Ostrich
Crested crane

Under the provisions of Ordinance No. 29 of 1902 various areas were from time to time proclaimed as game reserves. The first of these was practically that known under the old Government as the Sabi Game Reserve, above alluded to. The only difference made in the demarcation of the area was that the boundary line started from Crocodile Poort railway station and ran to Losisi's Kop instead of Pretorius Kop. This area was established under Proclamation No. 11 of 1902. About the same time Proclamation No. 12 of 1902 set apart the Pretoria town lands as a reserve; this was followed by Proclamation No. 7 of 1903, which declared the farm Groenkloof, or "The Fountains" (situated in the neighbourhood of Pretoria), a game reserve. Proclamation No. 17 of 1903 established an area in the district of Piet Retief as a game reserve, the boundaries being: On the north, Swaziland; on the east, Zululand; on the south, the Pongola River; on the west, the farm Rooirandpoort. The next area dealt with was in the Zoutpansberg district, and is known as the Singwetsi Reserve. Its situation is thus officially described:—"From the junction of the Groot and Klein Letaba Rivers northwards in a straight line to the Livubu or Pafuri River at Tahakuna's Kop; thence along the course of that river to its junction with the Limpopo; thence southwards along the Transvaal Portuguese border to the Oliphants River; thence up that river, to its junction with the Letaba River; and thence along the course of that river to the junction of the Groot and Klein Letaba Rivers." This reserve was established under Proclamation No. 19 of 1903. The last addition made to the reserves was authorised by Proclamation No. 38 of 1903, and consisted of an extension of the Sabi Reserve to the Oliphants River. The boundaries of the whole area are thus officially described:—"On the north, the Oliphants River; on the east, the Transvaal-Portuguese boundary; on the south, the Crocodile River; on the west, the watershed running from the Crocodile Poort railway station to Losisi's Kop; thence following the North Sand River to where it joins the Sabi River; thence following the Sabi River to Mambatini's Kraals, to where it touches the Selati railway extension; thence following the Selati railway extension to the Oliphants River."

Roughly speaking, the two latter reserves embrace all the Low Country

of the North-eastern Transvaal situated beneath the eastern escarpment of the Drakensberg, and extending thence to the Portuguese border. Their vast extent may be better comprehended if it is explained that their total area is from 13,000 to 14,000 square miles—that is, about one-eighth of the whole land surface of the Transvaal, taking this area to be 111,196 square miles (the figures given by the Surveyor-General). It embraces, in addition to Crown lands, a number of farms belonging to various large land companies, and other farms which are the property of individual owners. These land companies consented to the inclusion of their property within the Reserve, but there is no information as to whether the majority of the individual owners' wishes in the matter were consulted. The administration of the Reserve, which until the end of 1905 was in the hands of the Secretary for Native Affairs, is now controlled by the Colonial Secretary's Department. The staff comprises a Warden, with a salary of £600 per annum, and allowances for transport and subsistence; four white rangers, each receiving a salary of £360 per annum, and similar allowances; and a force of native police, whose numbers vary during different seasons of the year. In June, 1905, there were 70 of these police, with pay ranging from £2 to £2 10s. per month and rations. In addition, an interpreter is employed, at £4 per month. The average cost of the establishment is £3,900 per annum, and of the Department from £5,000 to £6,000 per annum. There is no revenue derivable therefrom. At the time the reserves were established, game existed in but small numbers in comparison with former years, before rinderpest and war had devastated the country. The writer has no data upon which to base any calculations as to their actual numbers, but their position in numerical occurrence was probably not materially changed from that of former years. As a result of the rinderpest, the Tragelaphs—Bushbuck and Kudu—will have fallen back to 4th and 12th in the list respectively, whilst buffalo, though still retaining their numerical position, will have become nearly extinct. The war probably brought Impala down to 6th or 7th place, and Kudu to 13th or 14th, and saw the last of the Eland and Roan Antelope. Under the rigorous system of policing inaugurated by the Government since 1902, however, the game is now reported to be increasing substantially. The following is the official list of game existing in the Reserve in June, 1904, numbered in the order of occurrence, and with some necessary corrections made:—

(1) Duiker (Grey ?)
(2) Steinbuck
(3) Reedbuck
(4) Bushbuck
(5) Waterbuck
(6) Brindled gnu
(7) Impala
(8) Burchell's zebra
(9) Sable antelope
(10) Tsessebe
(11) Warthog
(12) Bush pig
(13) Klipspringer
(14) Mountain reedbuck
(15) Kudu
(16) Giraffe
(17) Buffalo
(18) Hippopotami

No mention is made of either Red Duiker or Grysbuck; these should probably come on the list after Klipspringer, and before Mountain Reedbuck. At the close of the year 1903–4, also at the termination of the following year, the brief official report states that an encouraging increase in the numbers of the game is taking place. Elephants have entered the Reserve from the Portuguese territory; four being reported near the Singwetsi River, and six on the Oliphants River. These are the first elephants that have come in since the establishment of the Reserve, and hopes are entertained that they will remain there. Three rhinoceros have also been reported in the Singwetsi section, near the Intendi River, and four eland in the same vicinity; all having come in from Portuguese territory. The official report for 1904–5 contains no mention of game birds, but that of the preceding year states that their increase, now that native snaring and trapping is put a stop to, is marvellous, francolin and guinea-fowl having increased five-fold. The number of wild ostriches has steadily increased. The official list of the game birds (corrected as necessary) in the order of their occurrence is as follows:—(1) Noisy francolin, (2) Coqui francolin, (3) red-billed francolin, (4) Namaqua sandgrouse, (5) blue-headed guinea-fowl, (6) rufous-crested bustard, (7) thick-knee (or "Dikkop"), (8) ostrich, (9) Kori bustard. The writer is of opinion that there is some error in placing the blue-headed guinea-fowl fifth on the list. The common crowned guinea-fowl (*Numida coronata*) has always been far more numerous than the blue-headed species, probably in the proportion of 100 to 1, and this is doubtless the bird indicated. No. 9 on the official list, "Crested bustard," is probably intended for the Kori bustard. In the annual reports for 1903–4 and 1904–5 it is stated that there is no perceptible increase in the number of lions found in the Reserve. The total number of these animals destroyed from 1903 to 1905 was four. The wild dogs, hyænas, jackals, civets, and wild cats have been thinned out considerably by trapping and other means, or have been driven outside the Reserve. The large number of so-called "small cats" (97) which figure on the list of vermin destroyed during 1903–4, and 177 out of a total of 233 "carnivora" destroyed during 1904–5, were of course small viverrines—civets, genets, mungooses, &c., and not cats. Forty-one hyænas and wild dogs are also included in the latter total of 233. Depredations are occasionally committed in the Reserve by natives from Portuguese territory, and some notice boards have been torn down "by evil-disposed persons." Trouble was experienced in dealing with the attempted incursions of treasure-hunters, prospectors, and people searching for reported concession beacons, in the south-east corner of the Reserve, otherwise the work of supervision has progressed satisfactorily. The writer refrains from putting forward any of the numerous suggestions in regard to this Reserve which intrude themselves at every point, as these would necessarily partake of the nature of criticism, if only by inference.

The interests of game preservation throughout the Colony are being studied by a body known as the Transvaal Game Protection Association, which came into existence subsequent to the war, through the efforts of a number of gentlemen in Pretoria. The avowed objects of the Association are to protect the animals, birds and fish of the Colony, to secure the destruction of vermin, and generally to promote the interests of sportsmen. Rules and regulations were drafted and passed, some fourteen district branches were formed, and became affiliated to the central body, and in April, 1904, the Association was duly incorporated. Mr. E. F. Bourke, of Pretoria, is President of the Association, the entrance fee to which is 5s. and the annual subscription 5s. At the time of writing the number of affiliated branches was 17, and the total membership about 750. The members of the affiliated branches are, *de facto*, members of the Central Association. Half of the fees and subscriptions collected by all district branches are paid to the Central Association to meet current expenses. This Game Protection Association acts in the capacity of an Advisory Board to the Government on matters connected with game preservation, though, of itself, possessing no official control of any description. The work performed by it is unquestionably of a very useful nature, though there can be no doubt that there is room for great improvement in the administration of the Association's affairs. Until

Valley near Venterskroon (16 miles from Potchefstroom).

this improvement takes place a large majority of sporting men in the country will hold aloof from it. With a membership of only about 750, throughout the whole extent of a large colony where sport is so popular, it can scarcely be considered in any degree representative. Without discussing all the causes which, in the opinion of the writer, have brought about this measure of unpopularity, two of the most important may be here indicated. One is the absence of a system of local or district control, which works so satisfactorily in the Cape Colony. By such a system alone can the many difficulties arising out of the changed habits of buck and birds, due to climatic and other physiographical causes operating in various localities, be met and provided for. Another cause is the great difficulty experienced by such of the affiliated branches of the Association as are without any kind of railway communication, and perhaps situated at great distances from the capital, in sending delegates to attend the annual meetings. It frequently happens that this can be arranged only at great expense, and considerable personal inconvenience, and the former is a serious matter in depressed times such as have been experienced. Is it unreasonable to suggest that these annual meetings should be held alternately in outside district centres?

The future of game preservation in the Colony is quite hopeful, even though, under conditions as now existing, it will be future generations that will mainly benefit. Large depleted areas may some day become re-stocked; in the meantime, the hope may be expressed that the educative value of the Government Reserve may be made more evident to the general public by the insertion in the newspapers of a regular series of popular and scientific articles upon the fauna of the reserved area.

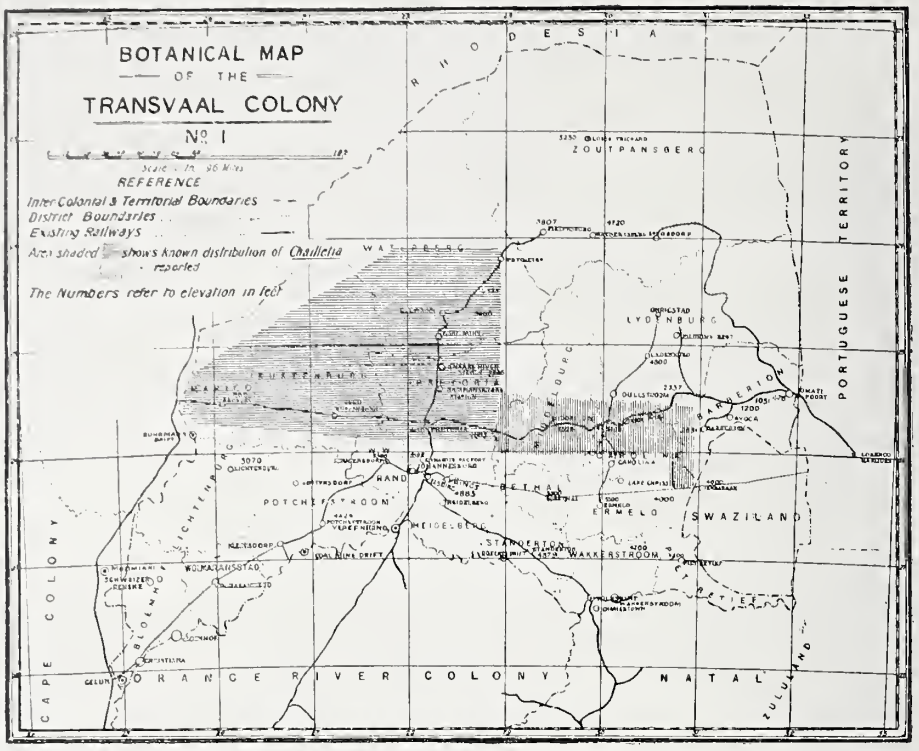
Botany.

WITHIN the limits imposed by the requirements of such a work as this it is extremely difficult to deal with the subject of botany in a manner sufficiently satisfactory to be of any economic value. Zoology presented difficulties, which naturally assumed greater proportions in the case of the invertebrates and of the vertebrates; but these are almost insignificant in comparison with those which surround the present subject. For not only has the writer to confine himself to certain circumscribed literary limits, but also to deal with the subject itself as being limited by certain hard and fast fiscal boundaries, which in reality do not exist in so far as concerns the flora of the country. Last, but not least, one has to face the fact that our knowledge of the Transvaal flora is yet in its infancy, and that the subject is still very imperfectly worked out. For the purposes of the present article, the writer has been enabled—through the courtesy and kindly assistance of the two greatest authorities on Transvaal flora—Dr. Harry Bolus, F.L.S., and Mr. J. Burtt-Davy, F.L.S., F.R.G.S., the Government Agrostologist and Botanist—to gather some valuable information contained in papers, pamphlets, and magazine articles. From these an attempt will be made to form a general estimate of the flora of the Transvaal Colony. It has already been shown that the Transvaal cannot, with any approach to scientific exactitude, be considered as a definite floral region, *per se*. Dr. Harry Bolus, F.L.S., in his "Sketch of the Floral Regions of South Africa" ("Science in South Africa," August, 1905), proposes the following arrangement of the South African floral regions:—

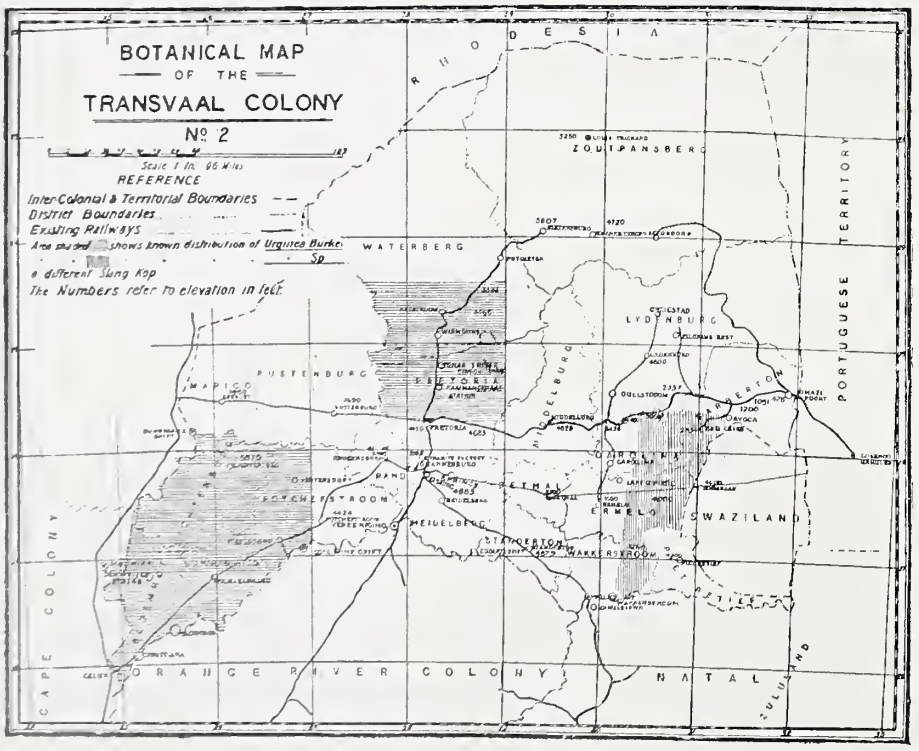
1. The Western Coast Region.
2. The South-Western Coast Region.
3. The South-Eastern Coast Region.
4. The Karroo Region.
5. The Upper Region.
6. The Kalahari Region.

The Transvaal falls within the Kalahari Region—a region so vast, "so imperfectly explored as to its physical divisions, its aspect, its climate, and the systematic constituents of its vegetation, that it is impossible at present to do more than offer a very general view of a country which will need many years of study, and which will

hereafter almost certainly require to be divided into several regions, or, at least, to be sub-divided into provinces." Dr. Bolus proceeds to show that this Kalahari Region includes:—"(1) The higher eastern mountain country, forming parts of Cape Colony, Natal, and Basutoland, with an altitude higher than 3,500 or 4,000 ft.; (2) almost the whole of the Orange River Colony, the Transvaal, and Bechuanaland."



With reference to the first of these two areas, the same authority gives it as his opinion that it will subsequently require separation as a region or province. It will thus be seen that the position which the flora of the Transvaal occupies is but a part of a far greater whole. As can be easily understood, the aspect of the country varies enormously throughout this vast region, and this is the case even within the Transvaal Colony limits. Witness the High Veld, a gentle sloping plateau, consisting of a vast undulating and almost treeless plain, a true grass "steppe," gay with wild flowers in the springtime. Then there are the isolated ridges and peaks of the Drakensberg range, having an elevation of over 6,000 ft., exceedingly rough and rugged in topography. The Middle Veld, which comprises some two-fifths of the total area of the Colony, and has an altitude of from 1,500 to 4,000 ft., again presents another aspect, being more or less covered with low trees, and in most of its characteristics intermediate between the High Veld and the Low Veld. It has cold winter nights, and some frost. The Low Veld, which is entirely sub-tropical in character, presents the appearance of a park-like country, often covered with dense scrub thickets, and everywhere clothed with tall, coarse, rank grass. These varying physical aspects naturally have their effect upon the flora of the country, but there are nevertheless some characteristic features possessed in common by the plant life of each zone, and shared with the flora of the whole region. The flora is, generally speaking, xerophilous in type—that is, adapted to dry climates—though in certain tracts along the Drakensberg, in the Zoutpansberg, Lydenburg, and Barberton districts, the climate is decidedly humid throughout the summer months. The normal climate of these latitudes is (as Mr. J. Burtt-Davy has pointed out in his paper, "The Climate and Life Zones of the Transvaal," read before the British Association, August 30th, 1905) tropical or sub-tropical, which is the climatic condition throughout the Transvaal Low Country, up to 1,500 ft. altitude. It is the fact that the greater part of the Colony consists of an elevated plateau, that gives a cooler climate than other parts of the world, situated equally near the equator, possess. Thus "our exotic flora" (says Mr. Davy) "is normally tropical or sub-tropical." In the same very interesting paper Mr. Burtt-Davy mentions that, "with the assistance of a grant-in-aid generously provided by the Council of the South African Association for the Advancement of Science, a card catalogue has been compiled of the plants recorded as occurring in the Transvaal." The list, however, he shows, is still very incomplete, "as so little has been done in the way of collecting in the more remote and less accessible districts, some of which pro-



duce a flora very different from that of much of the rest of the country." The following summary of the families of flowering plants is given by Mr. Davy as being "probably fairly accurate," as regards the relative proportion of genera and species in the largest families. Allowance must be made, he points out, for the fact that two of the authorities quoted, Engler and Prantl, have split up the families to a greater extent than has been done by Bentham and Hooker, which accounts for the apparent discrepancy in numbers of families and genera between the Transvaal and Kalahari. For the purposes of comparison with the relatively limited flora of the British Isles, the totals from the London catalogue are given, and the writer has added Dr. H. Bolus's summary for the whole Kalahari Region, as it appears in his "Sketch of the Floral Regions of South Africa."

	Transvaal (based on Engler and Prantl).	*London Catalogue of British Plants (based on Bentham and Hooker).*	*Kalahari Region (Dr. Bolus) (Based on Bentham and Hooker).*
Families (Orders)	140	92	126
Genera	792	516	783
Species	2,387	1,861	3,036

	Systematic Constituents of the Flora.		*After Dr. H. Bolus.*		
	Genera.	Species.	Orders.	Genera.	Species.
Monocotyledons (plants having but one seed lobe)	178 (22½%)	655	19	204	923
Dicotyledons (having seeds divided into two seed lobes, in germinating)	614 (77½%)	1,732	106	578	2,111
Gymnosperms (Dr. Bolus)	—	—	1	1	2

Mr. Burtt-Davy comments upon the remarkably large number of Monocotyledonous plants—viz., 22½ per cent. of the total genera recorded. Dr. Bolus shows the relative proportion of Monocotyledons to Dicotyledons to be 1 : 2·88 for the Kalahari Region. Mr. Burtt-Davy's figures for the Transvaal represent them in the proportion of 1 : 2·64. The following families are most largely represented :—

				Kalahari Region.	
		Genera.	Species.	Number of species.	Percentage of whole.
1	Compositæ	75	230	302	9·9
2	Asclepiadaceæ	42	184	148	4·9
3	Leguminosæ	57	160	247	8·1
4	Scrophulariaceæ	38	146	152	5·0
5	Liliaceæ	33	145	202	6·7
6	Gramineæ	54	142	251	8·3
7	Orchidaceæ	22	118	140	4·6
8	Acanthaceæ	25	91	115	3·8
9	Cyperaceæ	18	91	121	3·9
10	Iridaceæ	16	68	89	2·9
11	Convolvulaceæ	7	55	55	1·8
12	Rubiaceæ	22	54	52	1·7
13	Euphorbiaceæ	12	25	37	1·2

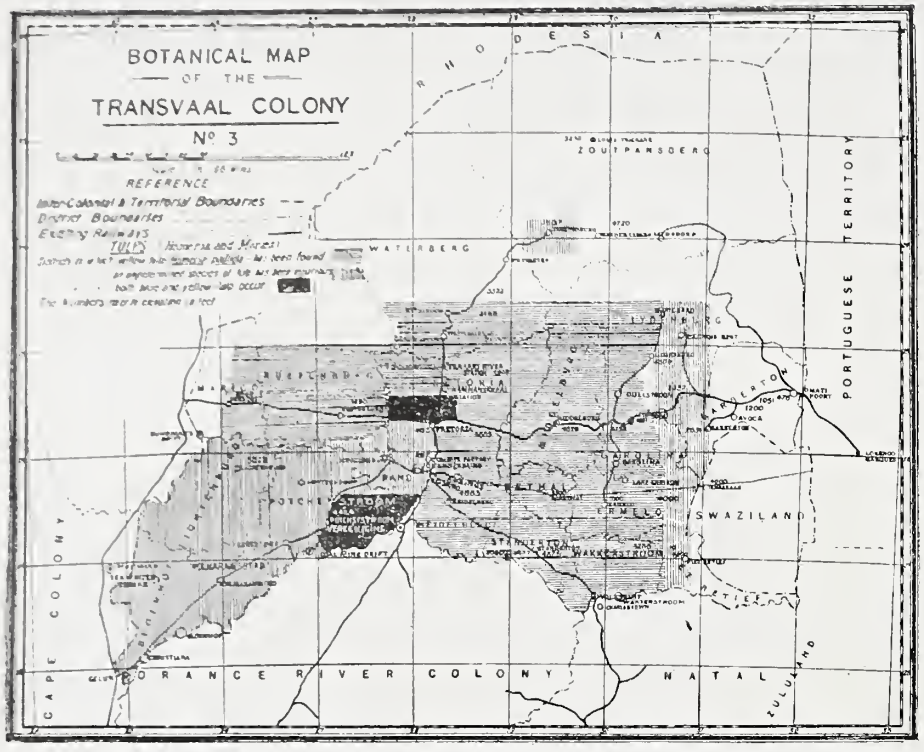
Other families represented within Transvaal limits are Amaryllidaceæ, Crassulaceæ, Polygonaceæ, Palmæ, Anacardiaceæ, Myrtaceæ, Olaceæ, Bignoniaceæ, Bombacaceæ, Combretaceæ, Rhamnaceæ, Proteaceæ, Loganiaceæ, Ficoideæ.

Commenting upon the above summary, Mr. Burtt-Davy remarks :—"The Graminæ are most conspicuous as regards number of individuals, therein affording a striking contrast to the Karroo flora. The Ericaceæ and Restionaceæ, which are so common at the Cape, are conspicuous by their scarcity, only about nine species of the former and one of the latter being known to occur. A noticeable proportion of the families is represented by very few genera and species. The vegetation is not truly mesophytic, in the usual sense of the word, nor is it really xerophytic, though xerophytic habits are developed by a number of plants. Many of the latter flower in winter or early spring. The flora of the High Veld is that of a typical grass steppe; that of the Middle Veld and Low Veld of a dry open forest. We have no desert flora, though a few stray species from the Kalahari Desert, and the 'Upper Region' of Dr. Bolus, reach our extreme western and south-western borders." The same authority also states that the Transvaal affords no exception to the rule that "perhaps nowhere in the world can one find an absolutely hard and fast line of demarcation between zones of land vegetation; there are always a few species more hardy than their fellows which overstep the line." But it would seem that the lines of demarcation are more distinct here than in many countries. Between the High Veld and Middle Veld, and the Middle Veld and Low Veld, there is a certain amount of overlapping of species; topographic features sometimes alter the local climatic conditions, and the flora—native and exotic—varies in consequence.

The following notes upon the plant life zones of the Transvaal are prepared from Mr. Davy's interesting article, "The Climate and Life Zones of the Transvaal," which appeared in the Transvaal *Agricultural Journal* for October, 1905 :—

Grasses give the dominant character to the vegetation of the Transvaal High Veld, the most abundant, as regards number of individuals, and the most conspicuous, being varieties of *Anthistiria imberbis*, and species of *Eragrostis* and *Andropogon*. "On the black clay loam or turf soils the grasses so predominate as to almost exclude other vegetation. On the sandy loams and limestone outcrops, however, one finds a much more varied flora, in which representatives of many plant families other than the Graminæ (grasses) are prominent. The turfy soils on the margins of 'pans' often produce a wealth of showy flowers, including several orchids, drosera, &c. Occasional rock outcrops occur, forming stony ridges (randjes) or isolated hills (kopjes). In some districts the latter are flat-topped, but they are often more or less conical. On these randjes and kopjes the herbaceous vegetation is more xerophytic (*i.e.*, drought-resisting) in character; bulb and corm-producing Liliaceæ, Amaryllidaceæ, Iridaceæ, and Orchidaceæ are common, and Aloes, Crassulas, Stapelias, Cotyledons, Mesembryanthemums, Pellæas and *Selaginella rupestris* are generally found. Many shrubs, such as *Chrysophyllum magalis-montana*, *Vangueria infausta*, *Landolphia capensis*, *Gymnosporia*, *Myrothamnus*, *Cussonia*, *Acacia*, &c., find sufficient moisture between the stratified rocks to support life. There are no native timbers, save on kopjes or occasional favoured spots (few and far between) where a few 'doorns' (*Acacia horrida*) or an odd 'Witstinkhout' (*Celtis rhamnifolia*) or Sugar-bush (*Protea*) may be seen. . . . The Middle Veld is mostly covered with low, often flat-crowned trees, usually not more than 15 ft. to 20 ft. high, but it also includes a certain admixture of High Veld

plants." Here we have the common wild Seringa (*Burkea africana*), African Wattle (*Peltophorum africanum*), and Zwart Benkenhout (*Faurea saligna*).



"The rainfall in this area is lighter and less certain than on the eastern High Veld, and appears to correspond more nearly to that of the south-western districts of the Colony, though data are at present lacking to give reliable conclusions on this point."

In some parts of the Middle Veld the poisonous Gift-blaad (*Dichapetalum cymosum*) occurs. It is a low-growing deciduous perennial, and throws up its new leaves before the grass is green, offering an irresistible temptation to stock which have not tasted a green blade for months. It is found on randjes and kopjes, ascending a little over the 4,000 ft. level, but is not known to occur in the High Veld proper, or in the Low Veld. The yellow "Tulp" (*Homeria pallida*) and the purple "Tulp" (*Moræa sp.*) also occur, but less frequently than on the High Veld. The Slangkop (*Urginia burkei*) is plentiful in some districts, and is fatal to sheep and goats.

The Low Veld comprises two belts—the coastal, which is influenced by the moisture-laden air from the Indian Ocean, and the drier inland belt. "The Low Veld zone is so different from the High Veld in aspect, flora, and fauna, that, in descending to it from the High Veld for the first time, it is difficult to realise that the two zones are not widely separated countries and in different latitudes." Its aspect is that of a well-wooded park, covered with low trees and shrubs, often forming extensive and almost impenetrable thickets. Here and there one traverses tracts of undulating prairie land, and elsewhere are seen steep hills, masses of detached stony kopjes, with gullies and valleys between. "Beneath and between the trees and the bushes the ground is well clothed with grass, as on the High Veld, but often of much taller and coarser growth. Grasses 8 ft. and even 10 ft. high are a common feature, even away from the rivers and marshes, where they are usually taller and coarser than on drier ground. The grass is burned off annually. . . . This burning has had no *appreciable* effect on the wooded character of the country. Doubtless it has had an injurious influence on the reproduction of trees, which will probably affect the economic condition of the district in years to come. But it is evident from the well-wooded character of the Low Veld that the veld fires alone are insufficient to account for the treeless character of the High Veld, especially in view of the fact that the rainfall is greater on the bare eastern High Veld than on much of the wooded Low Veld. . . . This area may be described as a semi-arid, tropical region. . . . . It is a wonderfully productive region, and where irrigation can be practised will yield crops throughout the year. . . . The flora of the Low Veld is almost entirely tropical or sub-tropical. It is a continuation of that of the Mozambique district of tropical East Africa. Many of the trees also occur in Angola, and the Congo districts of tropical West Africa. Several of them produce valuable hardwood timbers, some of which are being extensively cut and sent to the Rand for mine timbers. Others, such as the African Mahogany (*Afzelia quanzensis*), um-Tambuti (*Excœcaria africana*), and Red Ivory (*Rhamnus zeyheri*), would make excellent furniture woods, and will, doubtless, be highly valued as such when better known. As a rule the trees are low in stature; many are armed with thorns, spines or prickles; and they are often flat-crowned. Numbers of them are deciduous for a short period during the dry season. The following species are known to occur:—

Marula (*Sclerocarya caffra*; Anacardiaceæ)
Knopjes-doorn (*Acacia nigrescens pallens*; Leguminosæ)
Kajatenhaut (*Pterocarpus angolensis*; Leguminosæ)
Wild Date (*Phœnix reclinata*; Palmeæ)
Flat-crown (*Albizzia*) [*fastigiata* ?]; Leguminosæ)
Water-boom (*Eugenia cordata*; Myrtaceæ)
Bologna-sausage Tree (*Kigelia pinnata*; Bignoniaceæ)
Kaffir-boom (*Erythrina caffra*, var.; Leguminosæ)
Um-Tambuti (*Excœcaria africana*; Euphorbiaceæ)
Naboom (*Euphorbia reinhardtii*; Euphorbiaceæ)
Baobab (*Adansonia digitata*; Bombacaceæ)
Mapani (*Copaifera mopane*; Leguminosæ)
South African Mahogany (*Afzelia quanzensis*; Leguminosæ)
Vaal-bosch (*Terminalia sericea*; Combretaceæ)
Blink-blad Wacht-'n-bietje (*Zizyphus mucronata*, var.; Rhamnaceæ);
Lod-hout (*Combretum*, sp.; Combretaceæ)
Klopper (*Strychnos spinosa*; Loganiaceæ)
Fever-tree (*Acacia*, sp.; Leguminosæ)
Fan-palm (*Hyphæne* [*glauca* ?]; Palmæ)
Umzimbiti (*Milletia caffra*; Leguminosæ)
Umhlomu (*Adina galpini*; Rubiaceæ)
African Wisteria (*Bolusanthus speciosus*; Leguminosæ)
Red Ivory (*Rhamus zeyheri*)

Other Acacias, both trees and shrubs, are common; bright-flowered Bauhinias, species of Combretum, and numerous other trees and shrubs abound. The rapidity of plant growth and the length of the growing season point to the desirability of carefully considering and thoroughly testing whether this region is not suited to the cultivation, on a large scale, of such valuable hardwood trees as are climatically unfitted to the High Veld . . . . If the right species were selected, they would quickly outgrow the native bush, and might be of assistance in drying up malarial swamps."

There is a comparatively small area of tree forest (High Forest) in the Transvaal. The most important areas are the Woodbush in the Zoutpansberg district, at the headwaters of the Letsitele and Thabini Rivers,

and those in the vicinity of Pilgrim's Rest and Sabi, in the Lydenburg district. The total area of Government forest reserves in the first-named district is 11,898 morgen, and that of the last two mentioned is probably not more than 1,500 morgen. The principal trees occurring in these forests include :—

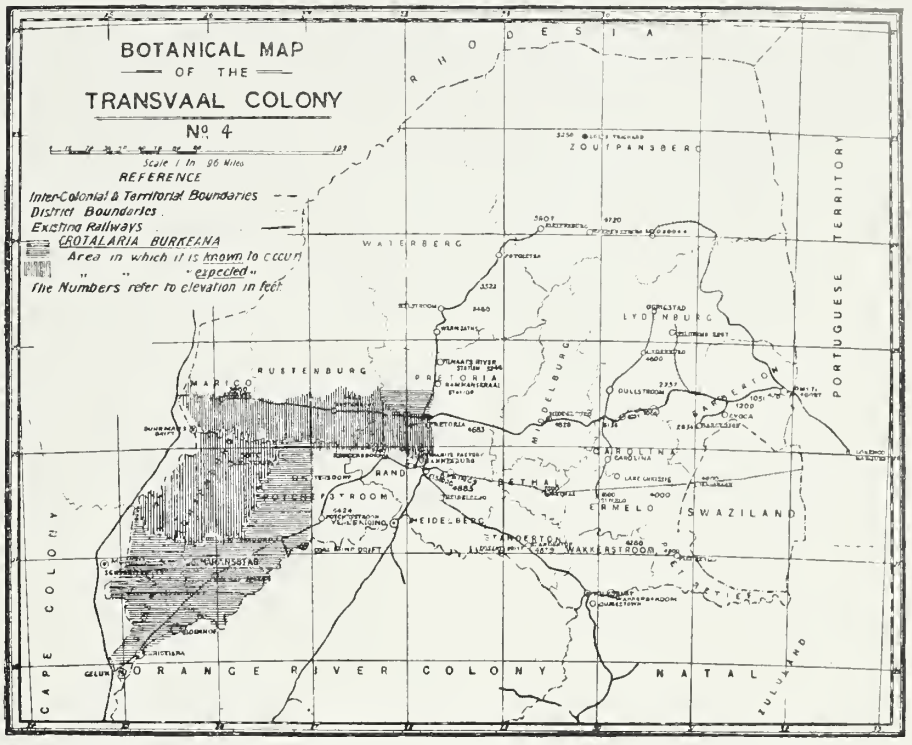
Apodytes dimidiata	(White Pear)
Buddleia salvifolia	(Salie)
Calodendron capense	(Wild Chestnut)
Celtis rhamnifolia	(Camdeboo Stinkwood)
Curtisia faginea	(Assegai)
Excœcaria africana	(Um-Tambuti)
Hippobromus alata	(Horsewood)
Kiggelaria africana	(Wild Peach)
Milletia caffra	(Umzimbiti)
Xymalos monospora	(Lemon Wood)
Ochna atropurpurea	(Plane)
Olea lauriflora	(Black Ironwood)
Podocarpus elongata	(Bastard Yellowwood)
Podocarpus thunbergii	(Upright Yellowwood)
Pygeum africanum	(Bitter Almond)
Rapanea melanophleos	(Wit Beukenhout)
Toddalia lanceolata	(White Ironwood)

These indigenous forests are evergreen, and throughout the summer months might well be styled "rain forests," being constantly either shrouded in heavy mists, or washed by the frequent rains peculiar to these districts. Unfortunately, as Mr. C. E. Legat (Conservator of Forests) points out, in an article in the annual report of the Transvaal Department of Agriculture, 1903–4, "all but the most inaccessible portions of the forest have been heavily worked in past years, and will require a long period of rest and protection." This gentleman further states that "many of the trees comprising the forests produce timber of high economic value—*e.g.*, the two Yellow-woods, Assegai, Red Pear, White Pear, and Bitter Almond, which are found in these forests, are highly prized by wagon-makers, and if a steady output of the timbers could be assured by systematic working of the forests, there is no doubt that a wagon and cart-making industry would spring up."

With regard to the grasses, which form so important a feature of Transvaal plant life, Mr. Burtt-Davy states that "about 150 species are already known to occur in the Transvaal, including the three phytegeographical divisions of the High Veld, the Bush Veld (Middle Veld), and the Low Country. This is a large number, considering how little has been done in the way of systematic collecting in the country. These 150 species represent 50 genera, nearly half of the 103 genera recorded for the whole South African flora—*i.e.*, the region from the Cape to the Limpopo. Only about seven alien species of grasses occur, a remarkably small number as compared with the number found in the Cape Colony. The genera of grasses most largely represented by individuals in the Transvaal flora appear to be *Anthistiria*, *Andropogon*, *Eragrostis*, and *Aristida*. The genera represented by the largest number of species are :

Eragrostis	with	23 species
Andropogon	,,	16 ,,
Panicum	,,	12 ,,
Aristida	,,	10 ,,
Setaria	,,	6 ,,
Trichopteryx	,,	4 ,,
Pennisetum	,,	4 ,,
Sporobolus	,,	4 ,,
Digitaria	,,	3 ,,
Michrochloa	,,	3 ,,

Thirty-four genera are represented by only a single species each."



In reference to noxious weeds of this Colony, the authority above quoted states :—"Investigation shows that the largest part of them are aliens, as is the case in most other countries. Many plants which migrate from one country to another find more congenial conditions in their new surroundings. Freedom from old enemies, fungoid, insect, or mammalian, and perhaps a milder climate or a richer soil, enable them to luxuriate and spread rapidly, until some new or old enemy appears to keep them in check." Further, Mr. Davy relates that he has collected in all 141 species of aliens in the Colony ; "a formidable list" he comments, "though but few of them can be considered noxious weeds." He further points out that many of the most injurious weeds of other countries, such as Field bindweed, and Canada thistle, have not yet reached the Transvaal, and by the exercise of due vigilance on the part of the farmers they can be kept out. "Most, but not all, of the troublesome weeds of farm and garden—*e.g.*, burr-weed and black-jack—are aliens. But not all aliens become weeds. Cosmos, the African Marigold, and the Evening Primrose are naturalised aliens, being spontaneous in several places in the Transvaal, but they are not weeds." Mr. Davy proceeds to define a weed as "a plant which grows spontaneously where it is not wanted," and classifies the 141 species and varieties into four arbitrary groups :—

1. Abundant species
2. Common species
3. Adventive species (*e.g.*, which only occur locally at present, but which show signs of spreading)
4. Colonists (*e.g.*, species rarely met with in spontaneous condition, and which do not yet show signs of spreading).

The number of species of each group is then as follows :—

Abundant species	18
Common species	29
*Adventive species	40
*Colonists	54
Total	141

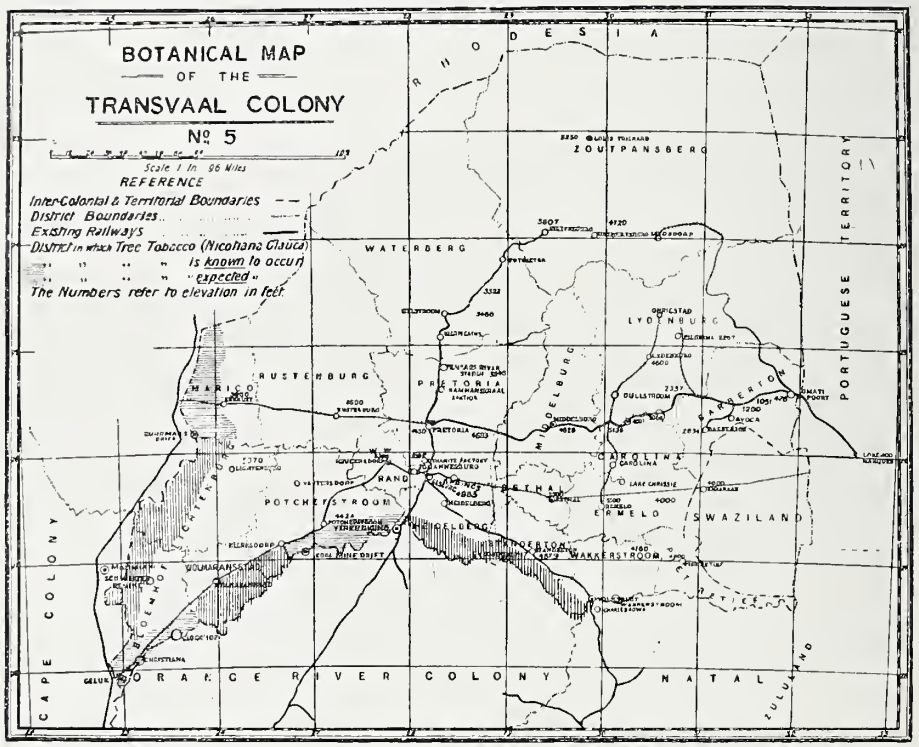
* Only occasionally met with as yet.

"Thus 94 species are only met with occasionally. They are either of very recent introduction, or not inclined to spread. Only one-third of the total number are at all common as yet. Only one-eighth of the total number are abundant. These proportions are sure to change in the course of a few years. They are more or less arbitrary, for it is impossible to draw definite lines between the four groups. The classification is sufficiently accurate, however, to convey a fair impression of the relative abundance of the species."

In addition to the 141 species above referred to, Mr. Davy includes three native plants which have become or are becoming noxious weeds—*e.g.*, the Witch Weed (*Striga lutea*), the Grapple Plant (*Harpagophytum procumbens*), and Devil's Claws (*Pretrea zanguebarica*).

"It is commonly supposed that all weeds are noxious or troublesome, but this is by no means the case. They may be useful, even though they answer our definition of a weed, in that they grow where they are not wanted—be it in the mealie patch, the flower bed, on the lawn, the footpath, or in the gutter. A weed, as such, is not an entity. A plant ceases to be a weed when it is not growing out of place, or where it is not wanted—*e.g.*, Bermuda Grass is a most injurious weed in an orchard, but in a pasture it is one of our most useful forage plants. If this were not the case there would be many more weeds, for, given suitable conditions of climate and soil, and immunity from such restrictive influences as fungus diseases and insect pests, almost any plant may become a weed." Mr. Burtt-Davy classifies weeds as: (1) Noxious, (2) troublesome, (3) innocuous, (4) useful.

Of the 18 abundant species, eight may be considered noxious. Of the 29 common species, eight are noxious; of the 40 adventive species, eight, though not yet common, are likely to prove noxious; and of the 54 colonists there are also eight which are likely to prove so. Of the 37 species which may be considered troublesome, but not noxious, seven are abundant, 10 are common, six are adventive, and 11 are colonists. Of the noxious weeds, seven stand out prominently as highly pernicious, troublesome and difficult to eradicate. These are: Dodder (*Cuscuta trifolii*), Witch Weed (*Striga lutea*), Burrweed (*Xanthium spinosum*), Cockleburr (*Xanthium strumarium*), Black-jack (*Bidens spilosa*), Johnson Grass (*Andropogon halepensis effusus*), Sheep sorrel (*Rumex acetosella*), and Horseweed (*Erigeron canadensis*). Of Johnson Grass, Mr. Burtt-Davy writes:—"It is one of the most pernicious weeds ever introduced by human agency. It was introduced into cultivation in Australia and the United States under the reputation of a valuable drought-resisting pasture and hay grass, and as furnishing good food for pigs. The latter part of the report may be true, but the former certainly is not. After twenty years' test in California it has been found that this grass does not withstand drought any better than any other pasture grasses. It only thrives well on rich, moist soils, where other and more profitable crops can be grown. It is, however, a veritable pest in agricultural land and in orchards, and one that it is almost impossible to eradicate."



Very little opportunity appears to have been afforded the Government Botanist of investigating the native economic plant products of the Colony, but, in addition to a few plants in use for tanning purposes, he mentions the Urera fibre plant, which is a shrub of the nettle family (*Urticaceæ*) and is known to the natives as Umbogozembe, its scientific name being *Urera tenax*. It is a shrub, or small tree, 8 ft. to 10 ft. high or more, with nettle-like leaves armed with stinging hairs, and is found in kloofs on the Magaliesberg, probably also along the Drakensberg. The stripped bast resembles China-grass, but is more brittle, and less lustrous. The fibre is described as being strong and of good colour. It is used by the natives as twine, and for making sleeping mats. Of wild cotton, Mr. Burtt-Davy remarks:—"There are three or more distinct types of wild cotton in the Transvaal. One is produced by a shrubby creeper or 'vine,' a wild convolvulus (*Ipomoea albivenia*). It appears to be of poor quality and little value. Milkweed cotton (*Asclepias puticosus*) is likewise practically useless. The others are true cottons, varieties of *Gossypium herbaceum*, or other allied species. Samples of the cotton of these, collected in the Zoutpansberg district, have been reported upon by the fibre experts of the Imperial Institute as of fair quality, but not to be compared with those produced from "American Uplands" when cultivated here. The commercial value of "Elands boontjes" has been investigated, but it is reported as only worth £2 10s. per ton in London. Sida fibre is considered of some promise.

There are several plants in the Transvaal which are highly injurious to stock. The following are, according to Mr. Burtt-Davy, the most dangerous species:—

Chailletia, or Gift-blaar (*Dichapetaltum cymosum*)
Burke's Slang-kop (*Urginea burkei*)
Tulp (species of *Homeria* and *Moræa*)
Dronk-gras (*Equisetum ramosissimum*)
Klappers, or Stief-ziekte Bosje (*Crotalaria burkeana*)
Bietouw (*Dimorphotheca nudicaulis*)
Tree Tobacco (*Nicotiana glauca*)
Stramonium, or Stink-blaar (*Datura stramonium*)
Castor Beans (*Ricinus communis*)

"Chailletia, or Gift-blaar," Mr. Davy writes, "is probably the most deadly of our poisonous plants, a very small quantity being sufficient to kill an ox. It is eminently a plant of the Bush Veld, and reports and personal observation indicate that it does not occur on the High Veld." Burke's Slang-kop is exceedingly poisonous to sheep and goats, but is said to be seldom fatal to cattle, usually acting only as a violent purge. Tulp chiefly affects cattle. Sheep and goats do not appear to feed on it readily. Horses and mules have been known to die from eating it. Mr. Davy says that "up to the present only one of the Transvaal species has been definitely proved poisonous. This is the common species, the Yellow Tulp (*Homeria pallida*)." The same authority notes that the word "tulp" is the Dutch for "tulip," although the plants thus known are not tulips, being more closely related to the irises of the northern hemisphere.

Horse-tail or Dronk gras (*Equisetum ramosissimum*, Desf.)
(After T. R. Sim.)
B. and C. Receptacles, magnified.
D. Spore and elaters, magnified.
E. Sheath, magnified.

Burke's Slang-kop
(*Urginea Burkei*, Baker).
Showing bud just appearing.
B. Off-set or new bulb, ready to start independent growth.

Burke's Slang-kop
(*Urginea Burkei*, Baker).
Showing bud almost ready to open.

Burke's Slang-kop
(*Urginea Burkei*, Baker)—in flower.
A. Bulb and flower (much reduced). C. D. Open flower
B. Bud and bract. E.

Chailletia or Gift-blaar (*Dichapetalum cymosum* Hook *f.* | Engl.)

It is eminently a plant of the Bush Veld, and reports and personal observation indicate that it does not occur on the High Veld." Burke's Slang-kop is exceedingly poisonous to sheep and goats, but is said to be seldom fatal to cattle, usually acting only as a violent purge. Tulp chiefly affects cattle. Sheep and goats do not appear to feed on it readily. Horses and mules have been known to die from eating it. Mr. Davy says that "up to the present only one of the Transvaal species has been definitely proved poisonous. This is the common species, the Yellow Tulp (*Homeria pallida*)." The same authority notes that the word "tulp" is the Dutch for "tulip," although the plants thus known are not tulips, being more closely related to the irises of the northern hemisphere.

The question of *remedies* for these poisons is being investigated jointly by the Divisions of Botany and Veterinary Science of the Department of Agriculture. The empirical remedies often recommended are usually found unsatisfactory, and are so conflicting that they are not repeated here; notes concerning them will be found in the Annual Report of the Department of Agriculture for 1903–4. No reliable remedy can be applied until two points have been scientifically determined—*i.e.*, (1) the physiological action of the poison on the animal system; (2) the chemical nature of the poison. The investigations are being pushed forward vigorously by the Department.

The field of Economic Botany in the Transvaal is an immense one, and its systematic investigation has but just begun. Some of the problems must take years of patient and scientific research and experiment to solve.

Sheep Sorrel (*Rumex acetosella*, L.)

Cockle-burr (*Xanthium strumarium*, L.)
(After Maiden.)
A. Fruiting branch. B. Leaf.
C. Fruit or "Burr."
D. Section through fruit, showing seeds in section.
E. Seeds, showing convex and flat (furrowed) sides.

Burr-Weed or Boete-Bosch
(*Xanthium spinosum*).
1. Branchlet of Weed.
2. Hook of Burr (enlarged).
3. Leaf, Burr, and Spines.
4. Burr (enlarged).
5. Leaf—Lance-shaped and Three-lobed.

Common Yellow Tulp
(*Homeria pallida*, Baker).

One of the most important to the future development of stock-raising and agriculture is the determination of the actual carrying capacity of a morgen of veld in different parts of the country. Until this is known for the Transvaal, with the precision made possible by agrostological investigations in other countries, no absolute valuation of a farm for stock-raising purposes can be arrived at. At present farm values are largely speculative, for no accurate data from before the war are available, and they can only be secured slowly and patiently, as is now being done by the Department of Agriculture. This line of investigation is being carried on by the Government Agrostologist and Botanist.

The problem of the introduction of *winter grasses* for the pasturing of cattle, sheep, and horses on the High Veld in winter is also a problem of Economic Botany, and is receiving attention. Several good grasses have been introduced by Mr. Burtt-Davy, from remote parts of the world, some of which have given most promising results, and are now being tested on an extensive scale at the Government Experiment Farms.

Departments of the Commissioner of Lands.

THE LAND DEPARTMENT.

CONSIDERABLE misapprehension appears to exist among some sections of the public as to the scope and functions of the Land Department of the Transvaal. Its administrative duties are laid down in the Crown Land Disposal Ordinance of 1903, and consist of the care and control of the public real estate.

The history of Land Settlement in the Transvaal may be considered as having its origin in the formation of the Cattle Preservation Department in May, 1901, which had for its object the preservation of breeding cattle, so that, on the termination of hostilities, there should be a nucleus from which the depleted country could be restocked. The scheme, however, did not work, principally owing to the demands made upon stock by the troops in the field. The Department then devoted its attention to agriculture, and developed various farms with a view to supplying the requirements of the civil population. In December, 1901, the Land Board was formed, and took over the assets of its predecessor, the Cattle Preservation Department. The Board acted in an advisory capacity to the High Commissioner on matters pertaining to land settlement, agriculture, and repatriation. A special organisation was subsequently created for the purpose of dealing with repatriation, and the Department was placed under the Colonial Treasurer. The Land Board meanwhile imported breeding stock, agricultural implements, steam ploughing plant, and artificial manures; at the same time it took over control of the horse-breeding farms established by the Repatriation Department, and started cattle ranches. All matters connected with agriculture were subsequently dealt with by Mr. F. B. Smith, who organised the Department of Agriculture, and was appointed Director. An active policy of land purchase was then instituted, and agricultural properties were acquired for Land Settlement purposes, in various districts, a staff of inspectors, surveyors, and clerks being engaged. On the declaration of peace, a camp was formed at Germiston, where accommodation was provided for those members of the irregular forces who were desirous of settling in the Colony. Some of these men subsequently obtained civil employment, or took service in the Railway or other Government departments. Those who wished to follow agricultural pursuits, but to whom no land could be allotted at the time, were drafted to other camps, subsequently known as Squatter Settlements. On December 31st, 1902, some 320 men were placed on land at Pietersburg, Warmbaths, Zeerust, Potchefstroom, Ventersdorp, Zwaartkoppies, and Middelburg. Each settler obtained on loan from the Land Board a plough, a team of draught animals, tent accommodation, and the necessary agricultural implements, seeds, and rations. In return the settlers agreed to pay to the Land Board one half of the crops won, another condition being that when the agreement between the Land Board and the settlers was cancelled the draught animals and implements were to be returned to the Board. A staff of superintendents was appointed, and these camps were maintained for some time. But the loss of animals through disease was heavy, though owing to the incompleteness of the records kept, and the deficient methods of the bookkeeping, it is impossible to state what this loss actually amounted to. After the lapse of a considerable period, permanent holdings were surveyed for those settlers of whom the superintendents of the settlements had reported favourably, and it was decided that these men should receive an advance of money, as, owing to the bad season, they were still unpossessed of capital. The number of men to whom advances were made had by the process of selection been reduced from 323 to 206. Advances of sums of £700, £650, and £500 were granted, according to the nature of the holdings, these amounts being allocated for the erection of house and fencing, for the purchase of farming requisites, including draught animals, and for living expenses for the first year, payable in monthly instalments. The course of procedure followed in regard to the allotment of holdings was regulated by the Settlers' Ordinance of December, 1902, which provided that the Lieutenant-Governor might set apart land for disposal under the provisions of such Ordinance, the land before being offered for sale or lease to be divided into holdings, surveyed, and valued. It therefore became the duty of the various Inspectors of Land to carefully inspect such land and to furnish a report thereon giving full particulars. Notices were subsequently published in the *Government Gazette* giving full information in connection with various holdings, their situation, extent, boundaries, and other description, and the price or rent at which each was avail-

able for purchase or lease. Application for holdings had to be made on prescribed forms which required the applicants to state their name and address, nationality, birthplace, age, previous experience, name and number of holding applied for, class of farming intended to be embarked upon, form of tenure desired, capital available, bank reference, testimonials, &c., &c. These applications were in due course submitted to the Land Board, and where an applicant was successful he was notified accordingly. Advances were made to such settlers, upon application being submitted on the prescribed forms, against the security of permanent improvements effected by the applicant, the latter being bound by the terms of the agreement to apply the money so advanced to the purposes for which it was granted. On receiving such application for an advance, the Inspector of Lands for the district furnished a valuator's report upon the improvements effected by the applicant, and the security offered by him. His opinion was also recorded as to whether the applicant was likely to pay his rent regularly, and to become a satisfactory settler. The valuator's report was then placed before the Land Board, together with full particulars of the applicant's proposals, and other information concerning him, and the Board after careful consideration made its recommendation to the Commissioner of Lands.

The procedure adopted in respect to agricultural land dealt with under the provisions of the Crown Land Disposal Ordinance is practically identical with that followed under the Settlers' Ordinance. The land has first to be inspected, valued, and reported upon, and as a rule the principle of gazetting such land has been adopted. During the year ending June 30th, 1905, steady progress was made in regard to the settlement of eligible Crown Land. Applications have been very carefully scrutinised, and every effort has been made to secure settlers of the right stamp. Many applications for agricultural holdings were rejected, principally because the capital available was inadequate. Of a total of 145 applications, 92 were approved. Out of the full number mentioned, 128 were dealt with under the Settlers' Ordinance, and the remainder under the provisions of the Crown Land Disposal Ordinance. The area allotted under the former was 109,487 morgen, representing a valuation of £101,455, and under the latter Ordinance 15,848 morgen, valued at £14,040.

The following gives a list of the various districts in the Transvaal where settlements have been formed under the provisions of one or other or both of the above-mentioned Ordinances, with some particulars bearing thereon :—

Pretoria and Middelburg.—Very little land in these districts is in the hands of the Crown, and such as there is consists principally of "uitvals" (land which has fallen out on the general survey). These are of little use for agricultural holdings, and consequently applications have not been invited for such land under the Settlers' Ordinance. They are more properly dealt with by straight-out sale under the Crown Land Disposal Ordinance, preferably to owners of adjoining ground.

Keerom.—This is a settlement on the Middelburg town lands, and has not been an unqualified success. The holdings often proved incapable of maintaining a settler, and consequently were relinquished. Want of knowledge on the part of the settlers, as well as other causes, has contributed to non-success. Violent hailstorms had been experienced, followed later by a drought and an outbreak of Rhodesian redwater. At the time of writing the number of settlers at Keerom was only 24. By an agreement with the municipal authorities of Middelburg, ratified later by the Legislative Council, the Department became in a position to give a right of purchase to the settlers instead of a lease only.

Ermelo.—The bulk of the land held by the Government in this district is situated in the Lake Chrissie Ward. Twenty-seven out of the forty-one farms acquired in 1902 from the Glasgow South African Company were taken up under the Settlers' Ordinance. The area thus acquired was 114,180 morgen, of which 77,708 morgen have been allotted. Many substantial improvements have been effected by the settlers. A large number of farmers from the Cape Colony settled in this district. They came principally from the neighbourhood of Molteno, and trekked to the Transvaal with their stock and equipment. The principal contributary cause for this "trek" was the recurring droughts. The district has certainly gained by the influx of these experienced men. The area under cultivation on June 30th, 1905, was about 3,200 acres.

Waterberg.—The number of settlers in this district at the beginning of 1905 was 61. Several surrendered their holdings, but new allotments brought up the number to 70. Poor and disappointing seasons, and the prevalence of Rhodesian redwater, proved a severe check to the early success of this settlement. The holdings consist mostly of "dry" lands. The area under crop in June, 1905, was about 6,500 acres. At Springbok Flats the holdings have been fenced, and comfortable houses erected. The greatest drawback to the settlers is the scarcity of native labour, only procurable at what is considered locally to be exorbitant rates.

Barberton.—Owing to retrenchment the district office of the Department was removed from Barberton to the White River Settlement, more centrally situated for administrative purposes. For the convenience of local inquirers the District Inspector pays a regular monthly visit to Barberton. The number of settlers in the district during 1904–5 was 64, an increase of 26 on the previous year's total. Considerable difficulty was at first experienced in dealing with those portions of areas proclaimed under the Gold Law capable of and suited to agricultural development. An understanding has now been arrived at with the Mines Department for granting leases for 21 years on proclaimed areas, such leases, while preserving the rights of prospectors and others under the Gold Law, to afford a reasonable measure of protection to the lessee as regards his homestead, permanent improvements, and cultivated lands. This, it is anticipated, will prove a partial solution of the difficulty.

White River.—The progress at this settlement is officially reported to have been "slow but satisfactory." An irrigation canal has been opened up for a distance of 10 miles. This serves forty holdings, and, as water is available for irrigation purposes, the necessary action is being taken to gazette the land as open to application. A number of inquiries were made for holdings, and it is anticipated that the whole land will be readily selected. The settlement is to be dealt with under the provisions of the Settlers' Ordinance. It may be considered to be free from Rhodesian redwater, as no outbreak of this disease occurred there during 1904–5. Two good stone and iron bridges have been opened up for traffic over the Nels and Crocodile Rivers, thereby affording facilities for transport between the settlement and Nelspruit railway station on the main Pretoria-Delagoa-Bay line. A descriptive pamphlet dealing with this settlement, containing a map and

much interesting information, has been published, and can be obtained on application to the Land Department.

Lydenburg.—This district is difficult of access owing to want of railway communication, and has been to some extent neglected. The Crown Lands are mainly situated "under the Berg" in the Low Veld, but as an altogether exaggerated idea exists that the whole of this area is exceedingly unhealthy it is not much sought after. The writer is acquainted with many who have lived for years in the Low Veld without experiencing any drawback in this respect. Given good housing, drainage, and a system of tree-planting (eucalyptus), most of the Low Country would be eminently habitable.

Ohrigstad.—The town lands are occupied by Boer squatters, rent free. It has been proposed, however, to put the matter on a proper basis, and, as a large area of the land is irrigable, instructions have been issued for the laying-off of a system of canals from which the holdings, as from time to time surveyed, will be equitably supplied. It is proposed to issue short leases (seven years) to the squatters, who for the most part are of the indigent class.

Zoutpansberg.—This district has been divided into three sub-districts for administrative purposes—East, North, and West Zoutpansberg. As a whole it offers perhaps a greater variety of soil, climate, and rainfall than any other district of the Transvaal. The outbreak of Rhodesian redwater, and the exceptionally dry summer of 1904–5, did much to discourage prospective settlers from taking up holdings. The total number of holdings allotted under the two Ordinances on June 30th, 1904, was 155. During the year ending June 30th, 1905, forty additional holdings were allotted, while seven were relinquished. Thus there were 188 occupied holdings on that date. Eighty-nine of these come under the Settlers' Ordinance, and fifteen under the Crown Land Disposal Ordinance. The remaining eighty-four are in Majoraland, and will probably receive titles under the first-named Ordinance. The East Zoutpansberg district, including the Woodbush, Klein Letaba, Oliphants, and Low Country Wards, is divisible into two classes, High Veld and Low Veld. Forty-three settlers were allotted holdings in this sub-district, some of whom received special financial assistance. During 1904–5 three of these assisted settlers relinquished their holdings. The others, on the whole, effected substantial improvements, built comfortable houses, chiefly of burnt brick, constructed water-furrows, erected fences, and cleared and worked a considerable area of land. The settlers are much handicapped by the scarcity of draught animals. The cultivation of cotton and rubber has been introduced. The farming community here stand in great need of being brought into closer touch with a market for its produce, a matter which in the interest of the land settlement merits earnest attention. The area of Crown land available is considerable, and its future development depends largely upon the transport facilities afforded to the farming community. In the North Zoutpansberg sub-district the Crown owns the greater portion of the land, much of which, however, is unsuitable for agriculture. Tropical cultivation may be successfully carried on in several parts, but, as elsewhere in the district, the lack of railway communication presents a serious drawback. The sub-district of Western Zoutpansberg has an area of about 6,000 square miles. The settlers here, as elsewhere in the Zoutpansberg, experienced an unfavourable season in 1904–5. They also are practically without transport facilities. In the South-Western district the settlement established shows better results and more substantial progress than elsewhere. The country is free from serious stock diseases, and the season 1904–5 was a fair average one. The district is essentially adapted to pastoral pursuits. No holdings were forfeited during the year under review. On June 30th, 1905, there were 99 holdings in occupation, and constant inquiries were being made by settlers desirous of obtaining ground. On the date mentioned the settlers possessed the following quantities of stock (the figures in parenthesis showing the number on June 30th, 1904, for comparison):—Horses, 153 (84); donkeys, 366 (252); cows, 2,053 (774); sheep, 6,876 (2,326); Angora goats, 2,338 (353); Boer goats, 1,454 (407); pigs, 723 (240). There were also 911 draught oxen, as against 562 in the previous year. "Dry" lands under crop totalled 2,970 morgen, and irrigated lands 376 morgen, as against 1,271 and 239 morgen respectively for the comparative period. Permanent improvements represented a value of £23,890.

Mooibank.—This settlement was surveyed upon the town lands of Potchefstroom, and was therefore subject to the Town Lands Ordinance, the local authorities possessing a reversionary interest in it. As the Government had advanced large sums of money to the settlers, it was deemed advisable in the interests of both parties to negotiate with the Municipal Council for the purchase of the freehold of the land. After a long delay the Municipal Council agreed to sell the settlement, and an adjoining area of town lands, 2,657 morgen in extent, in consideration of the payment of a sum of £21,000 and the granting of the farms Hesse (1,457 morgen) and Nooitverwacht (1,878 morgen). The Council further undertook to grant to the Government a full one-third share of the water which the Council was entitled to take from the Mooi River. There are 62 plots in the settlement, appurtenant to each of which is the right to graze 25 head of large stock and 100 head of small stock on the open lands of the town commonage. On June 30th, 1905, there were 59 settlers established on Mooibank.

Tzaneen.—This estate, which is situated in the Zoutpansberg district, was acquired for the purpose of establishing a centre for tropical and sub-tropical agriculture, and for assisting the development of the tobacco industry. The estate has therefore been conducted as an experimental farm. The tobacco crop for the year 1904–5 did not fulfil expectations; the yield was anticipated to be from 25,000 to 30,000 lbs. of cured leaf. That of the previous year was 40,000 lbs. The manager of the estate visited Europe and the United States of America in connection with the purchase of machinery and plant required for the manufacture of tobacco, cigars, and cigarettes. The necessary buildings have since been completed and the machinery installed. A turbine and electrical plant, for the purpose of generating motor power for the factory, has also been supplied.

A great proportion of the work done by the Lands Department is of a nature that does not lend itself to tabulation—such, for instance, as the settlement of claims for title to ground, the revision and prosecution of many claims that have been dealt with by the Government of the South African Republic, and the settlement of matters that had been left in abeyance by that Government. From April, 1905, to the termination of the period covered by the report for 1905, a sum of £5,876 had been collected by the Department from proceeds of sales and leases of Crown lands. During the financial years 1903–4 and 1904–5 the Board dealt with 500 applications for

land, of which 350 were recommended for approval, and with 135 applications for advances (representing a total of £41,275), of which 92 (representing £22,598) were recommended for approval.

Auction sales are arranged under the Crown Land Disposal Ordinance, and satisfactory prices were realised during 1904–5 at such sales. The total number of erven disposed of was 158, which altogether realised £19,804, of which £10,484 odd (20 per cent. of the purchase price) was collected up to June 30th, 1905, with interest amounting to £221 15s. 4d.

During 1904–5 the following new townships were proclaimed :—

Springs (consisting of 119 erven and 7 reserves —about 30 morgen).
White River (consisting of about 104 morgen).
Nelspruit (consisting of 120 erven and 1 reserve —about 44 morgen).
Cottesloe (consisting of 528 erven—about 46 morgen).

A number of erven and stands have been reserved under Section 12 of the Crown Land Disposal Ordinance for public and other purposes. The total number of such reservations made in 1904–5 was 283. The various purposes to which they were put, with the area allotted, is shown in the following summary :—

	Erven	Stands.
Hospitals	8	8
Offices and official residences	126	64
Prisons	58	56
Educational	57	56
South African Constabulary	6	15
Churches	32	23
Military and Volunteers ..	21	20
Native Locations	4,730 morgen	369 sq. rds.
Forestry ..	7,691 morgen	218 sq. rds.

Twenty-one reservations previously made were cancelled, being no longer required for the purposes for which they were allotted.

The Occupation Farms Ordinance, was passed in July, 1903, and was designed to replace the Occupation Law of 1886, repealed. Its object was to regulate all matters relating to farms, lots, or erven allotted under such law, which land was granted and held subject to conditions of occupation. Under the old law continuity of title depended upon the residence of the grantee upon his farm, lot, or erf. The later Ordinance provides for the occupation of *farms only*, the period of compulsory residence being eight months in each year At Mapoch's Gronden, 91 lots were gazetted, under Section 2 of the substituted Ordinance, the allottees being called upon to take out titles within 12 months from date of notice. Applications were received in respect of 87 of these lots, and the titles were in course of preparation when this was written. A list has also been compiled and published of persons who were allotted erven at Potgietersrust, district Waterberg, under Article 71 of Volksraad Resolution 12th May, 1888. These allotments cover a period of nine years from 1890 to 1899. The total number of erven gazetted was 239, in respect of which 66 applications for title had been lodged with the Department up to June 30th, 1905. At Louis Trichard 537 "burgher rights" erven were gazetted, of which applications had only been made for 16 up to June 30th, 1905. In Zoutpansberg, persons who were allotted occupation farms under Law 8 of 1886, and who had substantially complied with the conditions of occupation, were called upon to take out titles to the farms within 12 months of date of notice (February, 1905). The number of farms gazetted was 116, in respect of which 31 applications for titles had been received up to June 30th, 1905. It is provided by Section 3 of the Ordinance that should the applicant for title, in the case of a surveyed farm, lot, or erf, fail to comply with the conditions under which such farm, lot, or erf was granted, in respect of supplying diagrams thereof, paying all arrears of taxes, and registration and other fees, a further three months shall be given to the allottee to take out title, and thereafter the land lapses to the Crown. A number of applications under Section 4 have been made for exemption from occupation owing to the unhealthiness of locality, and exemption for varying periods up to 12 months have been approved. Section 7 provides for the forfeiture of farms where the conditions of occupation are not complied with. A number of farms which have been recommended for forfeiture were to be dealt with by the Land Board during 1905–6. Section 13 provides for the exchange of an occupation for a freehold title where permanent improvements equal at least to the value of the unimproved land have been effected. Twelve such applications were approved during 1905. The total number of farms granted by the Republican Government under Law 8 of 1886 was about 940, all situated in the Zoutpansberg district. The inspectorial staff visited and inspected 658 of these farms, principally in connection with the Occupation Farms Ordinance.

A great amount of work is done by the Land Department in connection with the collection of rent from native squatters on Crown lands, the system upon which such work is carried out having been inaugurated by the Department. The matter first came into notice in 1903, and in the latter part of that year the principle of demanding a minimum rental of 20s. per annum from each squatter was approved by the Executive Council. It was proposed to utilise the inspectorial staff of the Department for the purpose of collecting all revenue accruing from Crown lands. This was not sanctioned, however, on the ground that it constituted a departure from the recognised system of having an official in each district to receive all revenue from that district. The system ultimately adopted, and which was in force until April, 1905, was that all permits should be issued by the Inspectors of Land, and that the natives should be instructed to proceed to the nearest Receiver of Revenue ; or, in the absence of such officer, to the postmaster, and there pay the rent due. This method, as any man with local experience could have foretold, proved to be impracticable. As evidence of this, it is stated that although 5,463 permits were issued by the Department in October, 1904, the amount brought to revenue was only £596, the great proportion of which was collected by the Land Inspectors ! It was estimated that out of a total native population of 605,666, about one-seventh (81,820) were resident on Crown lands. The percentage of male adult natives is estimated at 25·96 per cent. (Report of Native Affairs Department, 1904), which means, approximately, that the total male population on Crown lands is 20,445. The census returns show a total coloured population of 1,053,975, from which must be deducted "coloured people" 23,891, the Swaziland natives 85,484, leaving a balance of 944,600. From this total must again be deducted 100,000, the estimated number of immigrant natives, leaving 844,600. Taking the ratio of squatters on Crown lands at one-eighth instead of one-seventh, to be within the mark, the natives on Crown lands would number 105,575, of which 26,294 would be male adults (rentable squatters). Deducting 10 per cent. for aged and infirm natives, there is a nett result of 23,755. It was therefore quite evident that the system of collecting the revenue from these people stood in urgent need of amendment. Accordingly an additional staff of six sub-inspectors (two each for the districts of Waterberg, Zoutpansberg, and Barberton), with district clerical assistance and native messengers, was employed, the expenditure being provided on Supplementary Supply. The conditions to

be observed by the native squatters were as follows:—

(1) All natives residing on Crown lands are only permitted to do so on the distinct understanding and agreement that their position will be similar to that of native tenants living on private farms.

(2) Payment of annual rent to be assessed by the Commissioner of Lands.

(3) Natives intending to remove their kraals within Crown lands must notify the Land Department, and obtain permission from the Inspector of Lands, by whom this permit is issued.

(4) All natives (men and lads) of a fit age are liable to be called out to work for a period of not more than six months of each year; such services to be paid for at the current local rate of wages.

(5) Any native wishing to remove his kraal or cattle from Crown lands must give notice as provided by the Squatters' Law, No. 21 of 1895.

(6) Crown lands occupied by natives under these conditions are liable at any time to be allotted under lease or licence to settlers.

The new system proved so far satisfactory that, whereas a sum of only £596 was collected under the old system during the period from July, 1903, to March, 1905, from April 1st, 1905 (when the whole of the work was undertaken by the Lands Department), to the period covered by the returns now quoted, a sum of £9,680 had been collected. Of this sum £6,101 was contributed by the Zoutpansberg district, and, but for the interruption in the work of collecting, arising out of a decision to suspend the work and the subsequent countermanding of this decision, the amount received would have been greater. Another system, however, has come into vogue, as, subsequent to June 30th, 1905, it was decided that the Native Affairs Department should in future undertake the collection of the rents from native squatters on Crown lands. This Department was made responsible for the collection of such rentals as from October 1st, 1905, and the services of the special staff of sub-inspectors and others employed by the Land Department were dispensed with.

From time to time the Department has had to deal with large numbers of cattle. In December, 1902, it imported 10,000 head of Texan cattle, of which 5,000 were disposed of to the Repatriation Department. The outbreak of Rhodesian redwater prevented the Department from selling the remainder, which were therefore distributed in small lots amongst the Boer farmers on the High Veld. A few, however (105 bulls and 1,852 heifers), were retained by the Department, and sent to Bothasberg. Of these only six bulls and 563 heifers were alive on June 30th, 1905, the mortality being due partly to Rhodesian redwater and partly to "poverty"—the result of the rigorous quarantine to which they were subjected. The number of cattle distributed amongst the farmers was 2,557 head, the progeny of which totalled 1,198. Of the calves, 206 (or 17 per cent.) died principally from poverty, and of the original heifers 240 succumbed, either to "poverty" or to tulip poisoning.

The following particulars of the advances made to settlers from the Land Settlement Loan funds are of interest. The settlers are divided into two classes, ex-squatter settlers—men who were taken from the forces and placed on the land after the declaration of peace (and numbering, according to the report, 206)—and ordinary settlers (those to whom holdings had been allotted under the provisions of the Settlers' Ordinance No. 45 of 1902, and who satisfied the Land Board that they were possessed of sufficient capital to work their holdings effectively). These numbered 315.

The ex-squatter settlers at Keerom (Middelburg town lands), Mooibank (Potchefstroom town lands), White River (Barberton district), and on "dry" holdings, were granted a sum of £129,450. These had been granted modified terms of repayment in consequence of the prevailing depression, and the difficulties settlers had to encounter during the first two years. Interest at 4½ per cent. is now only to be charged during the first five years, instead of being extended over the whole period of the 21 years' lease, as under the original terms of re-payment. A sum of £2,500 was expended on the purchase of donkeys to replace certain oxen which had been issued in the Zoutpansberg district, and which had succumbed to Rhodesian redwater, contracted before the animals were apportioned. To the ordinary settlers, advances amounting in the aggregate to £28,349 were granted, mainly against the security of permanent improvements. Some few were specially approved by the Lieutenant-Governor in Council, on the recommendation of the Commissioner of Lands. The rates of interest chargeable on advances to ordinary settlers are governed by the value of the permanent improvements offered as security. Half the value of the permanent improvements effected, plus half that of the improvements proposed to be effected by the advance applied for, may be advanced at 4½ per cent. Interest is then chargeable on the balance at 7½ per cent. It has now been decided to charge interest, in the case of ordinary settlers, only on advances during the first year of tenure by lease, and during the first two years of tenure by licence. The total amount paid out in advances to settlers from the inauguration of the Department to the 30th June, 1905, was £131,786. The amount repaid up to that date was not large, a circumstance due to the fact that the issue of advances only commenced after July 1st, 1903, and the ex-squatter settlers' advances, which formed the bulk of the amount advanced, were issued in small instalments, some of them being not fully drawn at the end of the half year, 1905, so that collection of re-payment could not in any case have been made sooner.

Voted Expenditure.—The amount originally voted by the Legislative Council was £26,947, which was increased by £20,232 in Supplementary Supply. This large increase was due to the creation of five new sub-heads—Texan cattle administrative expenses, rentals on Swaziland concessions, White River Settlement administrative expenditure, purchase of properties acquired by the Post Office Savings Bank Investment Board, and grant to Railway Administration for improving the Komati Poort sanitation. These amounted altogether to £8,665. The increase was further due to the inclusion of £4,927 for the purpose of repaying, to the Land Settlement Loan Funds, the amount expended therefrom on the working expenses of the Tzaneen Estate to June 30th, 1904; and further, again, to a large deficit in the estimated appropriations in aid, placed in the original estimates as £9,000, but which, when the Supplementary Estimates were framed, was only calculated to realise £650. As a matter of fact the actual amount realised was £428 odd.

LAND SETTLEMENT LOAN FUND.

The cash receipts and payments from 1st December, 1901, to 30th June, 1905, in connection with the above Fund were as follows :—

Receipts.	£	s.	d.
Treasury issues	1,075,124	10	4
Suspense accounts	10,418	12	11
	£1,085,543	3	3

Expenditure.	£	s.	d.
General expenditure	319,484	7	4
Reproductive expenditure ..	581,220	14	10
Recoverable expenditure ..	178,860	6	10
	£1,079,565	9	0

The Land Settlement Fund has hitherto received no grants from any other source but the Guaranteed Loan, and though it has been proposed to allocate to it certain proceeds from the operations of the Settlers' Ordinance of 1902, and the Crown Land Disposal Ordinance of 1903, no agreement had been arrived at when these notes were written. The sum allotted to the Fund from the Guaranteed Loan on July 8th, 1903, was £1,200,000 ; and a further sum in June, 1904, of £100,000, brought the total to £1,300,000. The estimated expenditure for the year 1904–5 was £151,900, but the actual net expenditure (£76,714 4s. 3d.) was considerably less. The saving was mainly effected by the cash settlement with the Repatriation Department, amounting to £25,950, and owing to cash receipts amounting to about £23,000 not being taken into account when the estimates were framed, and there having been no expenditure (as anticipated) in connection with the proposed land settlement at Wakkerstroom. This effected a saving of £15,000, and additional saving was made under the heads of expenditure, advances to settlers (£7,000), irrigation works (£2,937), and suspense accounts (£4,359).

In connection with the Government experimental Estate at Tzaneen, in the Zoutpansberg, and the White River Settlement, Barberton district, particulars in regard to the working of which are elsewhere described, the following tables are of interest :—

WHITE RIVER SETTLEMENT.

Land Settlement Loan Fund.—Capital expenditure for year ending 30th June, 1905 :—

				Dr.			Cr.		
Balance Dr. brought forward from 1903–4				£4,343	19	8			
Expenditure 1904–5 :—	£	s.	d.				£	s.	d.
Fencing	891	6	5						
Planting and maintenance of trees ..	129	8	1						
Buildings	381	12	2						
Well-sinking and pumps	68	0	5						
				1,470	7	1			
Realised by sale of stores 1904–5							507	17	5
Received from supplementary supply							2,000	0	0
Balance Dr. carried forward 1905–6							3,306	9	4
				£5,814	6	9	£5,814	6	9

VALUATION OF IMPROVEMENTS AT WHITE RIVER.

Improvements.	Valuation. £	s.	d.
Buildings (various)	1,125	0	0
Fences	112	0	0
Building, stable and fence	575	0	0
Park, fence and trees	100	0	0
Paddock fence	15	0	0
Cemetery fence	7	10	0
Settlement boundary fence	660	0	0
Tree-planting	100	0	0
	£2,694	10	0

The stores, implements, building materials, &c., on hand on the 30th June, 1905, were valued at £264.

TZANEEN GOVERNMENT ESTATE.

Dr. Balance-sheet as at June 30th, 1905. Cr.

Assets.	£	s.	d.
Land 11 farms	2,945	6	4
Tree plantations	6,170	14	3
Permanent improvements ..	4,029	5	8
Buildings	8,997	4	0
Live stock	1,037	10	0
Dead stock (plant, implements, tools, &c.)	2,365	11	2
Tobacco factory plant and machinery (including turbine and electric)	6,241	2	1
Furniture, fittings, and fixtures	680	0	7
Produce, grain, crops, &c. ..	632	0	0
Nurseries and seed beds ..	450	0	0
Cigar factory stock (cigars, tobacco, boxes, &c.) ..	805	4	3
Sundry debtors	291	11	0
Tobacco factory, stock of tobacco	1,885	16	7
Cash in hand and at bank ..	1,179	2	2
Balance of liabilities over assets	5,972	0	9
	£43,682	8	10

Liabilities.	£	s.	d.
Capital account at 1st July, 1904	2,367	5	1
Land Department Account ..	41,315	3	9
	£43,682	8	10

The following tables show the value of equipment, live stock, and fencing material, belonging to the Lands Department, on hand on 30th June, 1905 :—

	£	s.	d.
LIVE STOCK :—			
Controller of live stock	30,671	0	0
Waterberg district	1,077	10	0
White River Settlement	18	0	0
Uitloop	16	0	0
Wilson and Parr's holding	104	0	0
Experimental farm, Springbok Flats	597	14	0
VEHICLES, EQUIPMENT, BUILDINGS, ETC. :			
Waterberg district	18	0	0
Middelburg Settlement	102	0	0
Zoutpansberg district	85	0	6
Experimental farm, Springbok Flats	145	8	0
Steam ploughing plant	1,918	0	0
Controller of live stock	74	7	6
FENCING MATERIALS :—			
Waterberg district	,977	1	0
Zoutpansberg district	1,028	0	0
White River Settlement	200	5	0
Pretoria	1,500	0	0
Potchefstroom	2,979	19	8
Controller of live stock	12	0	0
Springbok Flats	145	0	0
	£42,669	5	8

The available funds on the 30th June, 1905, amounted to £197,473 3s. 11d. The estimated expenditure for 1905-6 was £87,000, and consisted of £22,962 in connection with the 1901-3 liabilities, £8,000 on suspense accounts for land purchases, advances to settlers, &c. The net realisable assets of the fund on the 30th June 1905, consisted of :—

	£	s.	d.
Fencing material	7,842	5	8
Live stock and equipment	34,827	0	0
White River Settlement	264	0	1
Bills receivable	11,620	14	0
Sundry small loans 1901–3	626	12	7
	£55,180	12	4

DEPARTMENTAL CORRESPONDENCE.—As showing the amount of correspondence dealt with in connection with this Department, it may be mentioned that the letters received and despatched during twelve months ending June 30th, 1905, numbered 42,238.

The following are the forms of (*a*) application for lease or purchase of holdings under the Settlers' Ordinance, together with qualification and guarantee forms necessary ; (*b*) application for an advance of money in respect of purchase of farming requisites, breeding stock, &c., on security of permanent improvements ; also the form of agreement :—

APPLICATION FORM.

Name in full
Permanent address (for correspondence)
Nationality and where born
Applicant's age last birthday
Married or single
If married, number and ages of children (if any)
Previous experience of farming
Name of holding
Number
District
Gazette Notice Number
Date

If holding be not gazetted state :—

1. What class of farming Applicant intends to pursue, *i.e.*,
   (*a*) Stockraising
   (*b*) General farming crops, &c.
   (*c*) Market gardening
   (*d*) Fruit growing
2. Extent of land required and district

Form of tenure desired, *i.e.*,
1. Purchase by instalment
2. Lease (5 years, with right of purchase)

Amount of Capital Applicant is prepared to invest in the farm :—

1. Cash	£	:	.
2. Securities and Stock (as per Schedule)	£	:	:
TOTAL	£	:	:

Bank Reference
With what Regiment did Applicant serve during the war, stating length of service and rank
Other qualifications or Remarks
List of testimonials (originals to be forwarded, which will be returned)

I, the undersigned, hereby apply to become Purchaser / Lessee of the Holding aforementioned, and I deposit herewith the sum of £ being One per cent. of the gazetted valuation of the Holding (or £15 if the Holding be not gazetted).

And I do solemnly and sincerely declare that I apply for the above Holding on my own behalf, and for my sole use and benefit, and not as Agent or Trustee for any other person, and that the foregoing particulars are true to the best of my knowledge and belief.

Signature
Place
Date

Declared before me,
District Commissioner of Lands,
or
Justice of the Peace.

Schedule of Property forming portion of Capital to be invested in the Holding herein applied for :—

	Valuation. £	s.	d.
Total .. .. £			

I, the undersigned, do hereby solemnly and sincerely declare that the above is my absolute and *bonâ fide* property, and is free of any debt or encumbrance, and that the above valuations are fair and reasonable.

Signature
Place
Date

To be filled in by the Applicant.

L. 10.
File No.

LAND DEPARTMENT.

Application for an advance under the Settlers' Ordinance No. 45 of 1902.

The Secretary for Lands, Land Department,
Pretoria.

Sir,

I beg to submit, for the approval of the Commissioner of Lands, an application for an advance under the Settlers' Ordinance No. 45 of 1902, in value pounds sterling, under the heads as specified hereunder, to wit :

Class A.	Farming requisites	£
Class B.	Breeding stock	£
Class C.	Permanent improvements	£
	Total	£

Full details and a true specification of the items included under these heads are given in the annexed schedule " A."

The articles, stock, requisites, and cash now applied for are required by me for the better working, use, and improvement of certain land granted to me under the Settlers' Ordinance No. 45 of 1902, being the holding known as No. of district.

In the event of my application being granted either wholly or in part I hereby agree to apply such articles, stock, and requisites as may be supplied and such sums as may be advanced to me from time to time to the purposes specified in this application and the schedules thereto, subject always to such special instructions, stipulations, and directions (if any) as may be included or given in the notification of the Commissioner's approval.

And I further agree to repay any sum advanced (1) under classes A and B, together with interest at the rate of seven and a half per centum per annum, and (2) under class C, together with interest at the rate of four and a half per centum in equal half-yearly instalments with interest thereon which shall be payable on the first day of January or July, as the case may be, following the issue of any advance, and the remaining instalments with interest thereon regularly thereafter on the first day of January and July of each year, until the whole amount advanced and due shall have been repaid in accordance with Section 23 of the aforesaid Ordinance. Provided always, and I hereby specially agree that if the license / lease aforesaid shall at any time be or become forfeited, lapsed or cancelled, or be surrendered by me, the whole of my indebtedness under this document shall then and thereupon be and become immediately due and payable notwithstanding anything to the contrary herein contained, and I bind myself to make payment accordingly.

I further agree that it shall be a condition of such assistance and advance (if granted) that all farming requisites, stock, and materials supplied to me by the Government, or purchased with any cash advanced to me by the Government, shall be and remain the property of the Government until the value or amount so advanced, together with interest, is repaid in full, and also until any bill, note of hand, bond, or other acknowledgment of debt, passed to secure the same, is paid in full, or until authority to alienate such farming requisites, stock, materials, or articles shall be given by the Commission, provided always that such farming requisites, stock, and materials shall none the less be at my sole risk ; and I further undertake to insure against loss by fire in an approved Insurance Company and for the full value thereof, in the name of the Commissioner of Lands, all buildings (dwelling-houses, out-houses, stores, stables, and other constructions) against which or the materials whereof any advance is or has been made to me, and to cede the policy or policies of such assurance to the Commissioner of Lands as collateral security, and to keep such assurance on foot so long as I shall be owing anything under these presents, and failing my so doing the Government shall be entitled to effect such insurance at my cost and expense, and to recover the same by action against me from time to time and at all times.

I further agree that the license / lease issued or to be issued to me, of the land above referred to, may be held by the Commissioner of Lands as security for the due fulfilment by me of my obligations in respect of the advances aforesaid, and that an endorsement to that effect shall be made on such license / lease or title.

I further agree that any conditions as to forfeiture of my license / lease in terms as therein set out, in case I shall in this application have made any untrue statement or in case I shall not fulfil my undertakings hereunder, shall be and remain unimpaired and of full force and effect.

I further agree that it shall be within the power of the Commissioner of Lands in his sole and absolute discretion to suspend or countermand the making of any cash advances or the granting of any assistance which he may previously have agreed to make or grant under this application, and it shall also be in his power and discretion at any time whenever he shall see fit to seize, remove, re-take possession of, and hold any assets, stock, materials, or goods supplied as aforesaid, or moneys advanced, and apply the same to any purpose or in any manner he may deem fit, provided that he shall in any such case credit me in account with the value of any assets, stock, materials, goods, and cash so seized and taken possession of.

Signature
Date
Name in full
Postal address

Witness :

Description of holding
Number
Name
District
Tenure
Number
(Lease or license).

SURVEYOR-GENERAL.

The year 1904–5 was a heavy one for the Surveyor General's Department, for, although the number of erven diagrams dealt with was not as great as in the preceding year, the number of original farm diagrams and sub-divisional farm diagrams showed an increase of 1,441 over that of 1903–4, the total number of diagrams examined during 1904–5 being 9,318, as against 7,877 during 1903–4. The drafting department prepared 923 certified copies of diagrams, 499 certified tracings of diagrams, and 1,876 compilations and sun prints. The total revenue thus derived, including the sale of maps to the public, amounted to £15,302 16s. 10d. Three thousand seven hundred and sixteen tracings and inspection reports were prepared for surveyors, and supplied to them free of charge. A great amount of work is done for various Government departments, such as preparing plans for school sites, South African Constabulary posts, Asiatic and Kafir locations, and the various reserves on town lands. Surveys for land settlement purposes were carried out during a portion of the period by three surveyors, and three assistants on salary, this number being afterwards reduced to one salaried surveyor and his assistant, working in the Zoutpansberg district. In other parts of the Transvaal the work was carried out by surveyors under contract, paid according to Government tariff. One hundred and forty-seven holdings were surveyed, for the Lands Department, during the period ending June 30th, 1905, in addition to which the survey of settlers' holdings at Thabina and Letsitele, in the Zoutpansberg district, were completed. Water-races for irrigation purposes were surveyed during the twelve months on the Tzaneen Estate and on the Queen's River, Barberton. The general survey of farms under the General Survey Law No. 9 of 1891 was reported as progressing quite satisfactorily. The survey of unsurveyed farms in seven districts was being proceeded with. These are divided into eleven sections, one surveyor being employed on each. It was anticipated that the General Survey would be completed by June 30th, 1907. Two hundred and eighty-one farms were surveyed during the year 1904–5, and the diagrams lodged in the office of the Surveyor-General. The greatest number of these (107) were in the Waterberg district.

The following Government farms were sub-divided for Land Settlement during the year: District of Bloemhof, 3; Potchefstroom, 3; Wolmaransstad and Caledonia, 4; Ermelo district, 3.

Instructions were issued for reserves to be surveyed on the town lands of 24 towns in the Transvaal. The field-work in connection with these surveys was completed, and the plans were in course of preparation and examination. The preparation of diagrams of portions of town lands to be transferred to the various municipalities was much delayed owing to disputed boundaries, and previous incorrect surveys, as well as insufficiency of data given on some of the original diagrams and town plans. This necessitated a complete re-survey in the case of eleven towns.

During the year 1904–5, twenty-one sites were surveyed for the South African Constabulary, and 24 school sites for the Education Department.

There were on June 30th, 1905, one hundred and twenty-four admitted Government surveyors in the Transvaal Colony. Copies of a revised and enlarged edition of "Instructions to Surveyors" which has been issued are supplied, free of cost, to all Government surveyors.

During the year a special commission which had been appointed under Law No. 3 of 1887 to establish and define beacons and boundaries of 18 farms on the Dwars River, Lydenburg district, completed its duties.

During the period from July 1st, 1904, to June 30th, 1905, the number of maps sold to the public from the Surveyor-General's office was 1,503, receipts amounting to £194. From January 1st, 1905, the sale of maps to the public was entrusted to the Government printer. The nett profit thus derived by Government up to June 30th, 1905, was £141 10s. 4¼d. In addition the military authorities were supplied with 7,330 maps, at a special rate, at a cost of £80. Eight thousand six hundred and forty-seven maps were also supplied to various departments of the administration, and to the Volunteers, free of charge, of the value of £544. New degree sheets of Ermelo and Machadodorp were completed, also a map of the De Kaap block, and one showing surveyed and unsurveyed areas of the Transvaal. In addition to these, two plans of the White River Settlement, maps for the Meteorological Department, and a small map of the Transvaal were also completed. A general revision and re-publication of the old series maps was undertaken. These included degree sheets of Pretoria, Rustenburg, Heidelberg, Potchefstroom, Vrede, Bethal, and Klerksdorp. A map of the hitherto unsurveyed north-eastern portion of the Transvaal has been compiled, in four sheets, for publication, as also a new degree sheet of Komati Poort. During the year 1904–5 ten new maps were published, and nine old ones revised for publication. A special standard railway map of South Africa was in course of preparation. The actual cost of production of this map was to be defrayed by the C.S.A.R. Administration.

AREAS AND SURVEYS.

Total area of the Transvaal	111,196 sq. m.
Total area of Crown lands	33,746 sq. m.
Total number of registered farms	11,525
Number of farms surveyed to 30–6–04	7,577
Area „ „ „	75,276 sq. m.
Number „ „ to 30–6–05	7,836
Area „ „ „	76,646 sq. m.
Number of inspected farms to be surveyed 30–6–05	3,683
Area of inspected farms remaining to be surveyed on 30–6–05	20,990 sq. m.
Area of uninspected and unsurveyed Crown lands surveyed during 1904–5	205 sq. m.
Number of farms on Crown lands surveyed during 1904–5	80
Area of uninspected and unsurveyed Crown lands remaining on June 30th, 1905	13,428 sq. m.

The revenue derived from stamps on diagrams during 1904–5 amounted to £14,087 6s. 6d.

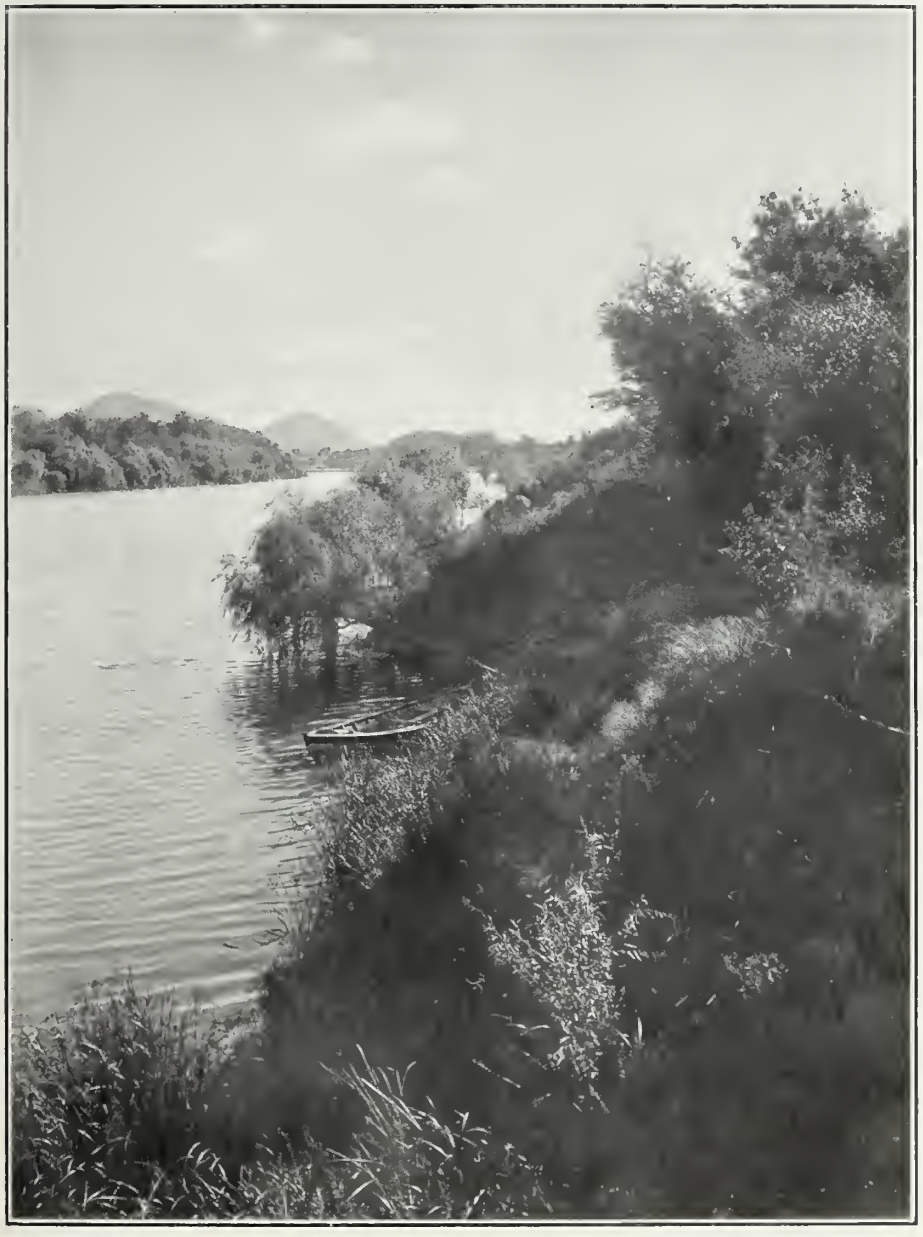
REVENUE AND EXPENDITURE.

The following table shows the revenue and expenditure of the Surveyor-General's Department during the period 1904-5:—

Services.	Expenditure.	Revenue.	Value of work done for other Government Departments.
	£ s. d.	£ s. d.	£ s. d.
1. Salaries	15,659 3 11	15,302 16 10	1,350 0 0
(a) Incidental expenses	65 11 7	——	——
(b) Purchase of instruments and material	71 18 8	240 8 8	——
2. Land settlement surveys	4,832 9 5	——	——
3. Other Government surveys	8,408 14 8	6,158 14 9	——

AGRICULTURAL AND PASTORAL.

Prior to the period of gold and other mineral development in the Transvaal the sole industry of the Boer settlers was a pastoral one, with sufficient agricultural development to suffice for their meagre needs. In most countries of the world where a great mining industry has sprung into existence it has been the incentive to the development of agricultural and pastoral possibilities, as it has formed an immediate market for products of the soil at its own door. The initial stages of agricultural and pastoral growth are costly. The clearing and breaking up of the soil, the stocking of pasture lands, with the attendant expenses of fencing and provision of necessary machinery, can never be expected to take place on a large scale in countries situated, as is the Transvaal, in the interior of a continent, without a large local population to warrant their introduction. This contingency has been provided by the enormous influx due to the development of the Witwatersrand gold fields. While a mining industry consists in a measure in extracting wealth from the soil which can never be replaced, the development of a country's agricultural and pastoral wealth is of lasting benefit. Therefore, in reviewing the possibilities of the Transvaal and its future prospects, it is necessary to go very carefully into the question of the suitability of the soil in this direction. Those who know the country best are of opinion that, generally speaking, the Transvaal is more suited for pastoral than for agricultural pursuits. There are many valleys distributed over the country in which loam soil has been deposited, capable of growing anything, provided water is available. In the Potchefstroom district, along the banks of the Mooi River, large tracts of country are suitable for the dairy industry, now in its infancy, which is capable of considerable development.



The Vaal River at Venterskroon (16 miles from Potchefstroom).

Entering the Transvaal from Natal in the north-westerly direction, there are to be seen a number of agricultural and pastoral holdings around Volksrust. Proceeding towards Wakkerstroom, and thence through the districts of Wakkerstroom, Piet Retief, and Ermelo, and on to Standerton, in the Eastern Transvaal, one traverses the best part of the Colony for pastoral pursuits, the chief of which is the sheep industry. Most of the farmers in this part of the country engage in "mixed" farming. On their holdings may be found suitable patches for cultivation—principally mealie crops, kafircorn, and potatoes. A few cattle are also raised, while the Standerton district has been found very suitable for horse-breeding.

One of the first undertakings of the new British régime was the establishment of experimental farms. Of these, one started at Ermelo in November, 1903, comprises 2,500 acres of land. Among the herds are to be found imported pedigree stock, including Herefords, Norfolk Red Polls, Frieslands, and Lincoln Red Shorthorns. The farm has also been stocked with a small flock of 60 high-class Stud Australian merinos, and pigs of the Tamworth and Yorkshire breeds, while its requirements in the way of fodder for the stock are cultivated on the estate. So far the results obtained have been entirely satisfactory, the live stock has done well, the increase has been good, and the young animals very strong and healthy. The experimental section comprises:—

1. The Horticultural department, with an orchard of 50 acres, well laid out. Among the many varieties of fruits cultivated are numerous descriptions of apples, peaches, pears, nectarines, apricots, prunes, Japanese plums, currants, and gooseberries.

2. The Forestry, under the control of the Conservator of Forests

3. Poultry Farming, consisting of a stock of the most prominent breeds, including Black Langshans, Black Orpingtons, Golden Wyandottes, Brown, Buff, and White Leghorns, Black Minorcas, Silver Campines, Black Hamburghs, Anconas, Embden geese, and Pekin ducks.

During the period ended 30th June, 1905, 300 acres of ground were broken up on the Ermelo farm, bringing the total amount of land under cultivation to 350 acres. The crops were fair, and might confidently be expected to improve when more attention could be devoted to the working of the soil. A large number of trees were planted as wind-breaks and for shade purposes. Most of these, however, unfortunately died during the winter, necessitating a repetition of the work. The nursery and plantation is in extent 967 acres, of which the nursery occupies about 5½ acres, laid out in blocks 60 ft. square. During the year 329,000 seedlings were pricked out, principally pines, cypress, and eucalyptus. The number of transplants in the nursery in June, 1905, was 146,430, and of seedlings 91,100. During the preceding year 10,423 trees had been sold to the public, 10,968 were issued to the Government experimental and stud farms, and 20,691 supplied to the New Scotland settlers. Of the plantation area, 84 acres had been permanently afforested. There is every prospect of the poultry section proving very successful, the light sandy nature of the soil at Ermelo being well suited to the requirements of the birds. The greatest value of the farm, however, in regard to poultry-rearing, is its exceptional suitability for ducks and geese, owing to the nature of the veld and the good water supply. Young birds raised here are equal in size and stamina to the parent stock; and, so evident is it that the farm is an ideal place for waterfowl, the whole of these birds which are in the possession of the Government Poultry Division have been sent over to the farm. On the route southwards from Ermelo through Bethal to Standerton one passes over some of the best grass lands in the Transvaal for horses, cattle, and sheep grazing, and approaching the Standerton district there are some extensive areas of grassy veld well adapted for the breeding of high-class stock in large numbers.

Standerton Experimental Farm.

In referring to the Standerton district, the establishment of a Government stud horse farm of about 9,000 acres, situated some nine miles north of the town, deserves special mention. It is conducted on the best and latest methods. At the commencement of the financial year ended June 30th, 1905, very few of the animals on the farm could be considered acclimatised, but during the year they had much improved, and became more accustomed to the climate and to their surroundings. They were reported to be in good health and thriving well. The cases of bowel trouble which for some time had caused anxiety appears to have ceased entirely. At the commencement of the last stud season it was resolved, in the interests of the Government and the public, that in the future stallions should be leased instead of being placed in certain centres for public stud. This proved so far satisfactory that during the season all available stallions were soon leased. The animals were generally well treated and with very few exceptions were returned in good condition. In the further interests of the public, the stud fee was fixed by the Government, in order to prevent any lessee from charging excessive fees to anyone desirous of sending a mare to stud.

The waters that go to swell the Vaal (Potchefstroom district).

At present there are no stipulations as to mares being approved of before being sent to stud, but such need to be introduced. Twenty-three stallions were available for stud purposes during the year ended June 30th, 1905, five of these being kept on the farm for public stud, and the remainder being leased. Altogether 653 mares were covered. There were at this period 78 mares on the farm, 69 of which were put to stud during the season. Of these 40 had proved to be in foal. Excepting in cases of sickness, mares are not stabled throughout the year, but ample shedding is provided as shelter from severe weather. The public are permitted to send mares to the Standerton Stud Farm for the season, if desired, a small charge of 5s. per month being made for grazing. This is an inestimable boon to farmers living at a distance. The season commences on September 1st. The lessee or lessees of a stallion agree to allow the farming public to send mares for service at a fixed fee, provided the list is not already full. The fees are fixed according to the following tariff :—

Prices paid for hire of stallion.	Fee to be charged by lessee not to exceed.
£25	30s.
£30	35s.
£40	45s.
£50	55s.
£60	65s.

The average charge for hire of stallions will range from £25 to £35, but higher rates are made in the case of exceptionally high-class animals. Written permission must be obtained if it is desired that a stallion shall serve more than 40 mares. Should a stallion die from any cause for which the lessee is to blame, during the period for which it has been leased, the lessee is held liable for a sum equal to the price already paid for the hire. The Government is doing everything possible to encourage the development of a good class of horse in the Transvaal, granting among other privileges free railage for mares returning from the stud farm. Cattle, sheep, and pigs are also kept on this farm. The former comprised a herd of 50 Texan heifers in calf, with a Shorthorn bull, and the sheep, at the period under review, consisted of a flock of 495 mixed merinos and Afrikanders. The pigs are of three breeds—Large White Yorkshires, Large Blacks, and Tamworths—the latter having thrived the best. At the time of writing there were 250 acres of land under crop, which consisted of Algerian and Tartarian oats, mealies, Boer manna, mangolds, carrots, swedes, lucerne, and sanfoin. The swedes were not a success. Three haystacks (300 loads), nineteen oat forage stacks (665 loads), and one Boer manna stack (30 loads) were harvested. The revenue, amounting to £810, was obtained almost exclusively from stud fees.

Further westward, in the direction of Heidelberg, the land becomes more suitable for agriculture, although the poorer sections are used for pastoral purposes. After leaving Heidelberg—the eastern limit of the gold-bearing country—and until reaching Springs (one of the centres of the coal-mining industry), little agriculture is met with, most of the land being used for cattle grazing. Surrounding Johannesburg, which is the next centre, there is very little agricultural farming, the land

LANDS ON THE GOVERNMENT EXPERIMENTAL FARM, POTCHEFSTROOM.

being principally taken up for market gardening and dairy grazing—more remunerative near a large centre like the Rand capital. South of Johannesburg, at Klipriversberg, the country is suited to market gardening, and large areas are under this class of cultivation.

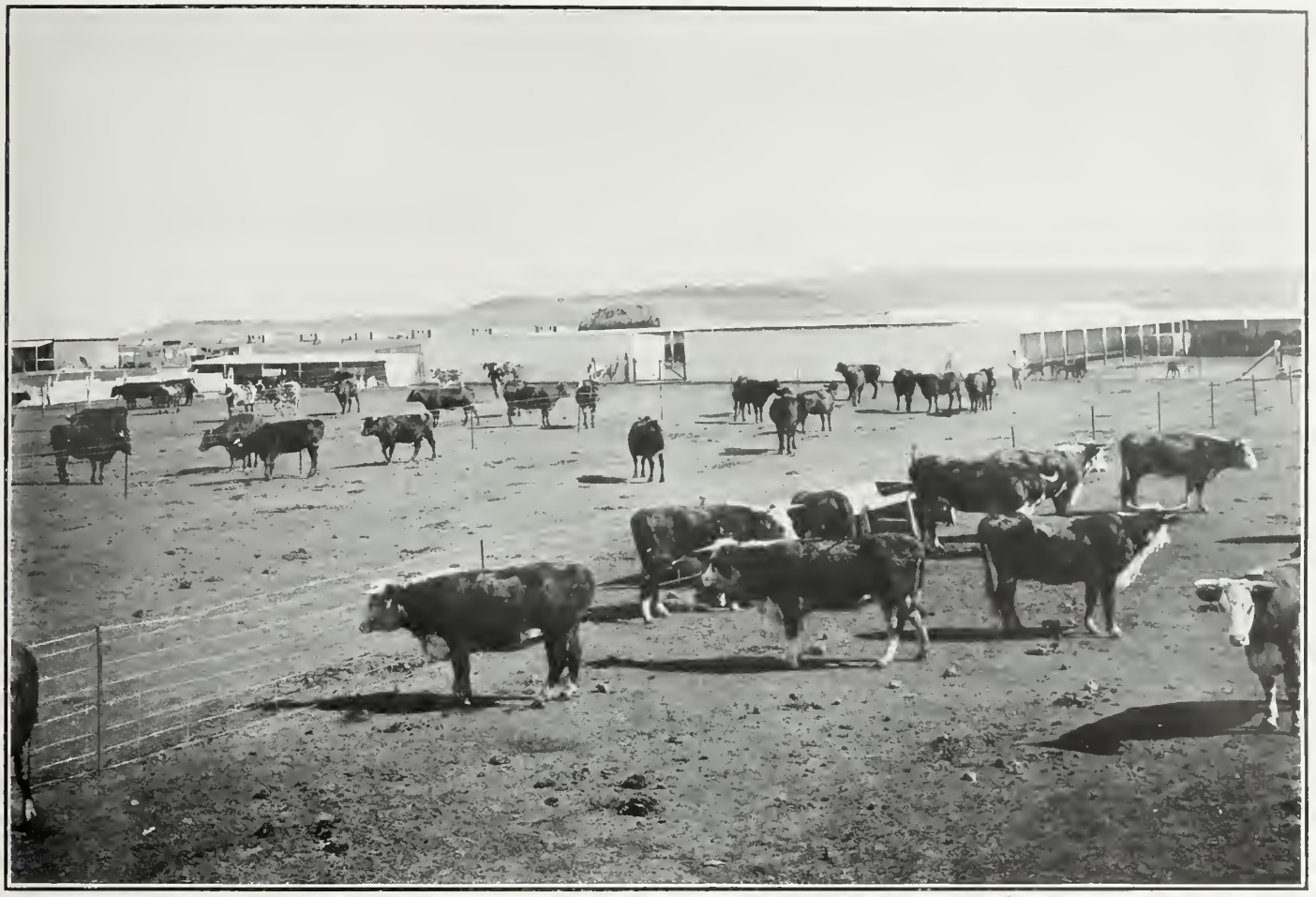
Potchefstroom Experimental Farm.

It is not until approaching Potchefstroom (89 miles from Johannesburg) that there is any indication that the soil is suited for agricultural purposes. Here the Government has established another experimental farm, in extent 2,700 acres, divided into 1,950 acres of grazing land, and 750 acres of cultivated land, intersected by water furrows, a portion of which is devoted to horticulture and poultry farming. The laying out of this farm has been so arranged with respect to fields and roads that the former will be suitable for experimental purposes and the latter convenient for the inspection of visitors. About 1,500 trees, principally eucalyptus and cypress, have been planted as wind-breaks, and for shade and for ornamental purposes, and oak trees have been planted on both sides of the main avenue. Silver and black wattles have also been put in. Very useful work is being done in the direction of ascertaining and recording the amount of water required for the various crops and the best method of its application. The total area of land under crop is 750 acres, all first broken up by a steam ploughing plant. The staff employed upon the farm consists of a manager, a clerk, a foreman, two stockmen, a blacksmith, a seedsman, four labourers, and a foreman and two engine-drivers with the steam plough. About 40 natives are regularly employed, and a few convicts are also found work throughout the year. Several new buildings have been erected on the property, including a stable for twenty mules and horses, an isolation hospital for sick animals, and stock shelters. Good water has been struck at a depth of 35 ft., and a considerable amount of ground has been fenced. With regard to the steam ploughing plant, the cost of working and maintaining the set, with double engine system, is about £2,000 per annum, calculating the coal at 20s. per ton. This outfit will plough and cultivate from 2,000 to 2,500 acres during the year. The crops dealt with on the farm are wheat, oats, barley, rye, grain and forage maize, sorghums, broom corns, kafircorns, manna, cowpeas, tares, beans, Egyptian clover, teff, lucerne, clovers and grasses (with rape), potatoes, pumpkins, marrows, cabbages, carrots, turnips, swedes, mangolds, sugar beet, and beetroot. The wheat crops during 1904–5 were fairly good, as also the oat crops. The latter yielded about an average of 5,000 lbs. per acre. Of the forage oats, using 120 lbs. seed per acre, the yield varied from 2,754 lbs. per acre to 6,827 lbs. per acre, according to the manure used. The highest result was obtained from bats' manure 400 lbs. and nitrate of soda 200 lbs. per acre; but the greatest gain was derived from nitrate of soda alone, 200 lbs. to the acre, which produced a yield of 6,614 lbs. per acre, showing a net gain of £7 12s. 8d. per acre as against £6 0s. 4d. per acre, the result of using the mixed manure with its yield of 6,827 lbs. per acre. Upwards of 300 acres of maize were planted,

House of the Manager.

10 lbs. seed per acre being used, and eleven kinds of manure experimented with, but though in each instance the application of manure gave an increase in yield over unmanured ground, the value of this increase was in no case sufficient to pay for the cost of the manure. Experiments with forage maize showed that the weight of green forage per acre was greatest in the close-distance planting. For green fodder, a distance of 2 ft. apart and the use of 20 lbs. of seed to the acre appeared to give the best results; for grain, 3 ft. apart, using 12 lbs. of large seed, 10 lbs. of medium seed, or 8 lbs. of small seed per acre. The heaviest yields per acre were obtained from Hickory King (white), 3,575 lbs. per acre, and Yellow Hogan (yellow), 4,730 lbs. per acre. The soil in which these trials were made was reddish loam, 12 in. to 13 in. in depth; subsoil, deep ironstone gravel; manure, 10 tons dung per acre in the previous year, and in addition 300 lbs. steamed bone flour per acre. Of the sorghums, the White Branching and Early Amber were the most successful varieties. Of mannas and millets, the Algerian Pearl Millet proved the most successful—planted in rows 2 ft. apart, 12 lbs. of seed per acre. It was ready for cutting for forage in three months, yielded 16 tons green forage per acre, and proved particularly useful for horses and mules. Other varieties also successfully experimented with were Japanese millet, early manna, and Boer manna. Teff grass is successfully grown. It provides a good sweet hay for winter keep. Various kinds of beans were tried, but did not give satisfactory results. Experiments are being conducted with several varieties of lucernes on "dry" land, and hitherto, despite the short rainfall—5·77 in. from time of seeding till the dry winter set in—the results promised to be very satisfactory, Cape-grown, an acclimatised seed, making the most robust growth. Out of thirteen varieties of potatoes tried—planted in reddish loam, 10 tons of dung and 400 lbs. of guano manure per acre, irrigated once in April—Scottish Triumph and Up-to-Date gave the best results, the former yielding 13,920 lbs. and the latter 13,360 lbs. per acre. A

trial between Evergood and Up-to-Date resulted in a yield of 11,840 lbs. per acre from the former, and 14,400 lbs. from the latter, the seed used in this case being second crop from imported seed. Where the seed (Up-to-Date) used had been grown at least two years in the Transvaal the yield was only 10,400 lbs. per acre. Pumpkins, marrows, and mangolds were grown with astonishing success, but turnips and swedes failed. In the case of mangolds the best results were obtained when using a manure composed of 160 lbs. per acre sulphate of ammonia plus a mixture of superphosphate, sulphate of potash, guano, steamed bone flour, and basic slag. The yield per acre was 54,450 lbs., a nett gain of £10 8s. 6d. per acre. Variety experiments in reddish loam resulted in Red Globes producing a yield of 62,370 lbs. per acre, as against 42,570 lbs. from Long Red, the next highest. Sugar beets gave a yield of 25,000 lbs. per acre, the sugar content being 16·1 per cent. Considerable attention is devoted to horticulture on the Potchefstroom Experimental Farm, planting operations on a large scale having been undertaken, and a vineyard of eight acres laid out. The orchards and vineyards are entirely clear of pests and disease of any kind. No irrigation or manurial experiments were made, but the ground was well broken up, the ploughs used being Oliver No. 13, and an Oliver A. The cultivation in the orchard is carried out with a Planet Junior cultivator, and in the nursery and vineyard with a small Planet Junior. During ploughing a McColm's Pulverizer and Compressor were used with great success. In the early summer the trees were whitewashed against sunburn. The orchard is 24 acres in extent, and contains 370 odd varieties of trees—amongst others 87 varieties of apples, 45 of pears, 26 of domestic plums, 25 of Japanese plums, 44 of peaches, 32 of apricots, 15 of nectarines, 2 of damsons, 9 of figs, 6 of quinces, 5 of walnuts, 8 of persimmons, and 6 of raspberries. Seven acres of the vineyard have been planted with 59 varieties of grapes.



CATTLE ON THE FARM.

Cattle and Horses.—The Potchefstroom Experimental Farm has established almost a record amongst farm stock, in that for two years not a single loss of an animal was sustained. A Clydesdale stallion and four mares, which were added to the stock, cost, the former £150 and the latter £50 each in Scotland, the total expenses of landing them on the farm being about £32 each. About 70 oxen are in-spanned daily, on the farm work, the remainder being rested alternately. The imported cattle caused a great deal of trouble and anxiety. They were stabled during the first year, and very little trouble was experienced, but as this plan proved very expensive the cows were turned out during the summer, the bulls remaining stabled. The result was that all the cows contracted redwater, while the bulls remained perfectly healthy. One bull, however (a Shorthorn—Coates), died of enteritis, and nine cows and eight calves also succumbed, principally to redwater. The breeds now kept on the farm are Shorthorns (Coates), Lincoln Reds, Herefords, Sussex, Aberdeen-Angus, Jerseys, and Ayrshires. The total number of pedigree cattle on the farm on June 30th, 1905, included:—Imported bulls, 10; im-

ported cows, 76; bulls bred on the farm, 48; heifers bred on the farm, 43; calves born, 54. Eight of the latter died and two were sold. The demand for the hire of bulls for service is greater than can be supplied, but the system is not considered altogether satisfactory. The expense of transferring bulls to different parts of the country is great, as is the risk of loss from disease, while in some cases the animals are badly managed and are returned in poor condition.

Sheep.—Although the country in the vicinity of Potchefstroom does not bear a good reputation for sheep-breeding, owing to the prevalence of "blue-tongue," the sheep on the Potchefstroom farm have on the whole been profitable. The following table is extracted from the report of the general manager of the property:—

	Numbers		
	On June 30th, 1904.	On June 30th, 1905.	Sold during the year.
Rams and ewes	95	155	70
Lambs	48	53	10
Wethers ..	—	9	1

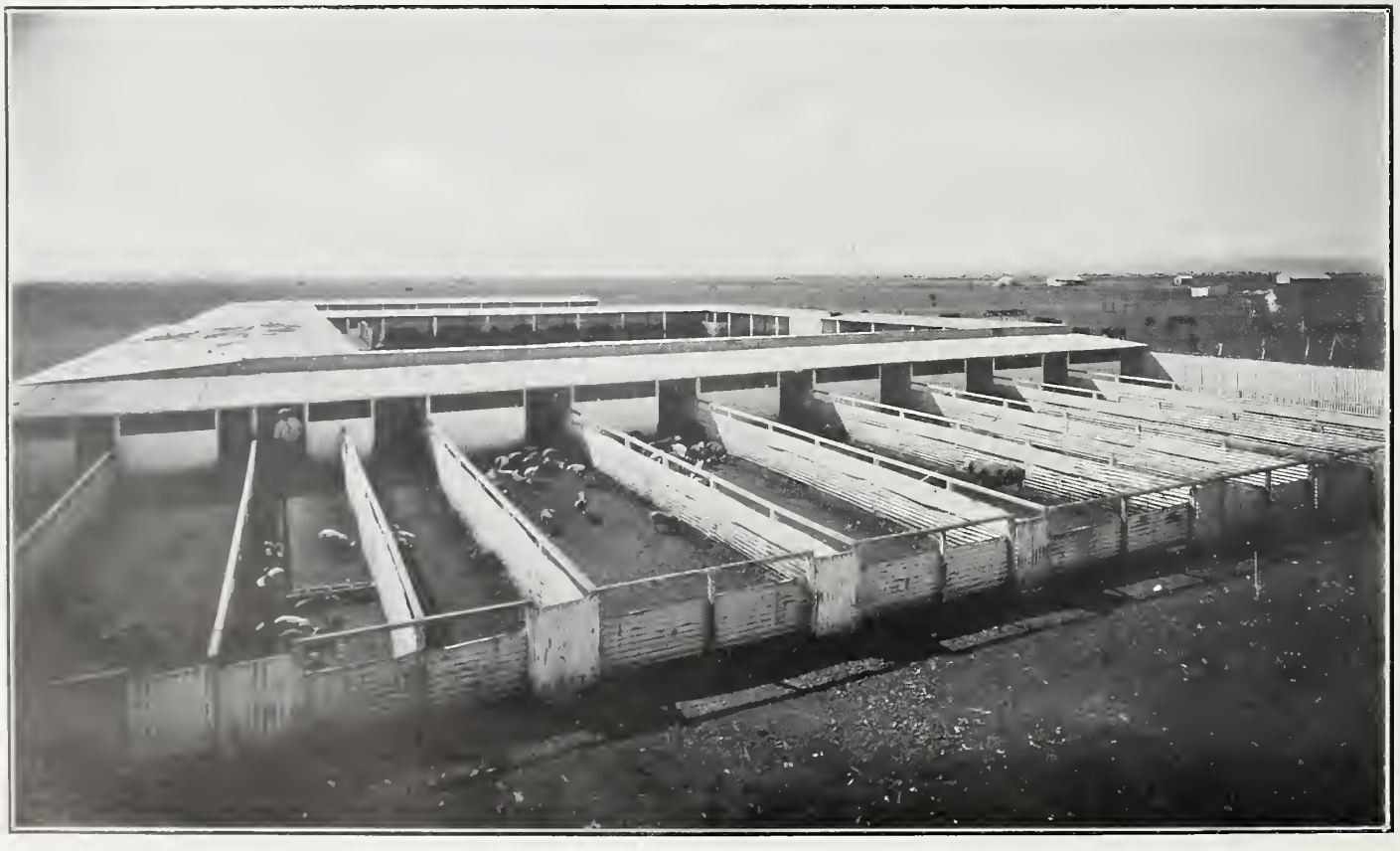
No sheep were purchased during the year. The sales amounted to £238. Our illustrations show some of the stud flock. Wool to the value of £34 12s. 5d. was sold, Merino fetching 6½d., Shropshire and Suffolk 5d., and Africander 4½d. per lb. The sheep on the farm on June 30th, 1905, totalled:—Imported rams, 5; imported ewes, 79. Bred on the farm: rams, 1; ewes, 70; wethers, 9; lambs, 53. About 30 ram lambs of the Suffolks and Shropshires, bred on the farm, were to be ready for sale and service during the breeding season.

Pigs.—No farm animals in the Transvaal are more profitable than pigs, and none stand in need of greater improvement. On the Potchefstroom farm endeavours have been made to obtain the three best and largest breeds of pigs suitable for pork and bacon. These are the Large White Yorkshire, the Tamworth, and the Large Black. Two hundred and twelve pigs, which were with few exceptions the progeny of the imported stock, were sold between August, 1904, and June 30th, 1905, and realised about £834. These breeds of pigs have been established on the Ermelo, Standerton, Lichtenburg, and Springbok Flats farms, from stock issued from the farm. Such losses as occurred (principally among the young animals) were mainly due to pneumonia, the result of colds contracted from the extremes of temperature, and the somewhat unsatisfactory housing accommodation. The following table from the general manager's report shows the number and breeds of pigs on the Potchefstroom farm on June 30th, 1905:—

Breed.	Imported.		Bred on the Farm.		
	Boars.	Sows.	Boars.	Sows.	Young pigs.
Large Black ..	2	5	2	3	26
Large White Yorkshire ..	2	9	1	2	50
Tamworth ..	1	7	1	1	47
Total	5	21	4	6	123

Stud.—The thoroughbred stallion "D'Arey" from Standerton stood at stud on this farm during the season, and served mares at a premium of two guineas. The newly-imported Clydesdale stallion "Transagrie" was to stand at stud during the season following.

Farm Administration.—Arrangements have been made for providing accommodation on the Potchefstroom farm for six pupils. No premium is charged, and furnished quarters are provided, but each pupil is expected to work with diligence and to assist in the various farming operations which take place. The total expenditure incurred during 1904-5 was £8,649 4s. 2d., including £3,807 11s. 8d. for salaries and wages, £740 13s. rail charges on live stock, goods, &c. (this includes £500 which should have appeared in the previous financial year's statement), £1,925 3s. 1d. material, equipment, fencing, steam ploughing plant, and coal for same; and £931 3s. 11d. for purchase of live stock. The total revenue was £2,227 3s. 1d. This shows



PIGSTYES

considerable excess of expenditure over revenue, but when the condition of the property on June 30th, 1905, is compared with its condition a year before, one is led to the conclusion that the outlay has been justified.

Between Johannesburg and Pretoria, at Irene (about half an hour's rail journey from the capital), there is a well-laid-out farm under irrigation, and approaching Pretoria are to be seen some very nice market gardens. Northwards from Pretoria good agricultural land is to be found. Near Warmbaths there is an experimental farm on Springbok Flats, consisting of about 100 acres of land, 25 acres laid out in plots for testing different varieties of cereals for dry ground. The district is very suitable for agricultural purposes, with a rich soil, and healthy climate, but the greatest drawback is an insufficiency of water. From August 23rd, 1904, to April 15th, 1905, only 16·61 in. of rain fell. Twenty-one varieties of cotton were sown in November, 1904, of which Peterkin, Griffin's Improved, and Hawkins' Improved gave the best yield. Further north, at Pietpotgietersrust (now shortened to "Potgieters"), the climate is very warm. The soil is well adapted for tobacco, cotton, coffee, and possibly other kinds of sub-tropical cultivation. The township is well watered, and bananas, oranges, naartjes, peaches, and apricots flourish. Surrounding Pietersburg (the capital of Zoutpansberg district), and extending to the Leydsdorp district, the country is most suitable for agriculture, and the cultivation of nearly all kinds of cereals, wheat, oats, barley, and mealies. Tobacco-growing is successfully carried on, and cotton has been cultivated with success. Around and beyond Houtboschberg, in the same district, there is some splendid timber. In the Zoutpansberg district the Agricultural Department has established a tobacco plantation and cigar factory on the farm "Tzaneen," south of Leydsdorp. Approaching Lydenburg, the country is rich in agricultural lands, the principal crops being tobacco, maize, and other cereals. Ramie has been tried, but with indifferent success. Fruit does well in this district, particularly at Krugerspost and in the Waterfall Valley. Excellent tobacco is grown in the Sabi district, and also under the eastern escarpment of the Drakensberg. In the neighbourhood of Pilgrim's Rest and Sabi, and extending more or less brokenly to Barberton, are some fairly extensive areas of natural forest, lying at an average elevation of from 4,000 to 5,000 ft. The High Forests of Pilgrim's Rest are in extent about 3,000 acres, and, as the demand for mining timber is quite beyond their capacity, it is proposed to reserve portions of Government farms for the purpose of forming plantations. The forest at Sabi Hoek is about 1,500 acres in extent. The Komati Poort and Barberton forest areas consist of scrub only. At the White River Settlement the construction of an irrigation canal was commenced on June 23rd, 1904, and completed on April 15th, 1905, water being led into the canal on May 12th. The supply has been passed down as required, to the settlers. There are ten miles of canal excavations, 409 ft. of aqueducts, five canal dams, and four flood escapes. Seventeen hundred acres of land have thus been made irrigable. It is worthy of mention that a plucky attempt is being made on a farm under the eastern escarpment of the Drakensberg, near Belvidere, to farm Cape ostriches. Owing to the dryness of the season, to the fact that the birds were not acclimatised, and to the rapidly increasing numbers of predatory animals which find their way out of the Government Reserves, this experiment has not met with much success.

To the west of Pretoria is some excellent land, admirably adapted to the cultivation of lucerne. Sixty miles from Pretoria Rustenburg is situated, near the Magaliesberg Mountains—the centre of a district noted for a superior quality of tobacco it produces. The soil is rich and fertile. Large areas are under agriculture and fruit culture, this being one of the main sources of the fruit supply for the Johannesburg market. At Oliphants Poort, near Rustenburg, it is intended to construct a storage reservoir with a masonry dam on the Hex River, and canals leading therefrom on each bank. The dam will be 375 ft. long, having a maximum height of 130 ft. above its foundations, and will be built across the "poort." Floods will be discharged by a waste weir, and by sluices in the dam. A canal will be led from the dam on the right bank at as high a level as possible. About half a mile from the dam the left bank canal will be taken out and will cross the river in a siphon. The area which will thus be brought under command is practically unlimited, and will possibly extend as far as Rustenburg. Soundings have been taken over the site of the proposed dam, sections have been made, the capacity of the reservoir ascertained, and the canal lines surveyed. At Blaaubank, also, some splendid tobacco is cultivated. West of Rustenburg is the Marico Valley (of which Zeerust is the centre), one of the most fertile districts of the Transvaal, where experimental fruit gardens were established in February, 1904.

PASTORAL

The pastoral lands of the Transvaal are most luxuriant during the rainy season, which commences in September, and extends over the summer till the month of April. The veld at this period is clothed with a growth of verdant grass, which attains a great height, but has only been put to commercial use of late years. The grass is now reaped in most districts by the more progressive farmers, the cutting season being at the end of March. It is then stored as fodder or made into ensilage for use in the dry winter months. Not only is the grass turned to profitable account, but the danger of veld fires is minimised. Were the grass allowed to stand during the long dry period its inflammable character would be a serious menace to stock and other property should it accidentally become ignited. Formerly the veld was "burnt off" each winter by the farmer, under the mistaken impression that it improved the condition of the grass in the next season. Strenuous efforts of the Agricultural Department at Pretoria have remedied this. The *Agricultural Journal*, issued by the department, has clearly pointed out that veld-burning robs the land of the nitrogen which is so essential in fertilising the soil. (This journal, published quarterly, and printed in both English and Dutch, is the best of its kind in South Africa.)

A feature that can scarcely be understood by those who have never visited the Transvaal is the denudation of the High Veld of its grass during the winter months. In this period the veld becomes so burnt up as to afford no grazing for stock, which therefore has to be taken to the Low Veld for pasturage. In the rainy season the converse applies, and the stock can then return to the High Veld. In the spring time, when the new growth of grass appears, great care has to be taken not to put cattle on it too soon, owing to the poisonous "tulp" which usually grows among the new grass, and whilst young cannot be distinguished by the stock. Regarding these poisonous plants, Mr. J. Burtt-Davy, the Government Botanist, writes as follows:—"In the Transvaal, the dry season of the latter part of winter and early spring is the most dangerous time for stock as regards vegetable poisoning. The months of July, August, September, and October are particularly dangerous. At that

time of the year green herbage is scarce. After a diet of dry feed, lasting for some months, stock are eager for succulent herbage, and greedily devour the first green shoots. They will often pick off the first green leaves of the mimosa (or doorn-boom), almost as painful an operation as eating the unprepared 'leaves' of spiny 'prickly pears,' as the cattle sometimes do in Cape Colony. Unfortunately several of our very earliest plants of spring are poisonous—*e.g.*, the tulps and the 'gift-blaar.' I have found a vigorous growth of tulp in somewhat moist vlei lands as early as the middle of June, when no other wild green forage was to be had. The tulp season is at its height from July to the end of September, according to locality. 'Gift-blaar' is most dangerous in September, 'slang-kop' about October, 'dronk-gras' in January and February, and 'klappers' in February and March. After the new grass foliage has made good growth, it is said that cattle poisoning from tulp and 'gift-blaar' is much less frequent. It is reasonable to suppose that when there is a choice, the mild, sweet, and tender leaves of the grass would be more acceptable than the more highly-flavoured and somewhat bitter leaves produced by several of these poisonous plants."

Horses.

The Transvaal High Veld is considered to be very suitable for horse-breeding, and it is stated that it cannot be surpassed by any other country. Although horse-breeding has been taken up seriously by but few farmers in the past, it promises to be a big industry in the future. The horse is not much used in connection with farming, or for heavy draught purposes, which is usually the work of the ox. The military authorities at the close of the war disposed of large numbers of remounts and mares and a few Colonial ponies, and those that remained were selected for breeding purposes. At present the stock of brood mares in the Transvaal may be said to be very small. Nearly the whole of the mares are of the Colonial pony or remount type, and there is every likelihood that in a few years there will be a great shortage of horses. This has already been felt, as is shown from the fact that in 1905 the South African Constabulary placed an order for supplies with the Australian Colonies. The Boer horse, or colonial pony, as it is termed, should with a little more development in breeding make a splendid remount. The Government Stud Farm at Standerton, already referred to, is doing excellent work, and there are also some good stallions owned privately in the Colony. Investigations with respect to obtaining a preventive against horse sickness have been an important feature in the work of the Government Bacteriological Experiment Station for a long time past, and, though it may perhaps be somewhat premature to speak with assurance, there is every reason to believe that a sure preventive as far as mules are concerned has been discovered, and that before long the immunising of horses will be equally certain. One of the principal difficulties to be contended with is the arising of complications introduced by the development of biliary fever after inoculation. From October, 1904, to June 30th, 1905, one hundred and fifty-six artificially-immunised mules were exposed in the districts in the Transvaal where horse sickness was most prevalent—viz., Crocodile Valley, Lydenburg, Nelspruit, Leydsdorp, Marico, and Warmbaths. During nine months only one death occurred, and it was very doubtful whether it was due to horse sickness. Certainly the season was not a "bad" one, but in the above-named districts very few animals survive even in good seasons. The loss occurring in the process of immunisation has, in the case of mules, been reduced to the very small proportion of from 3 per cent. to 5 per cent., and improvements on this are anticipated. Horses, as before mentioned, have given more trouble, but as each succeeding experiment gives a better result, it is confidently anticipated that the risk will be reduced to a minimum. The approximate number of horses in the Colony on June 30th, 1905, was 38,880.

Mules.

There are some very good mules bred in the Transvaal, by the Spanish donkey out of Cape mares, but the majority of these animals have been imported from America. Mules are very useful animals for light transport and general uses. They are much more hardy than the horse, and can stand rougher fare and treatment, but are not of much use for heavy farm work, and they are as costly to keep as a horse. They are susceptible to horse sickness, in a lesser degree. The approximate number of mules in the Transvaal on June 30th, 1905, was 23,215.

Donkeys.

During the outbreak of the Rhodesian redwater, farmers in the infected districts had to resort to these hardy little animals for means of transport, large numbers of donkeys, mostly mares, having been sold to them by the Agricultural Department and other agencies. The donkey is almost immune from the prevalent horse diseases in the Transvaal. Donkeys bred in South Africa have been found to thrive far better than those imported. When the pestilences pertaining to South Africa have been overcome there will not be much need for them, although the production of a good class of jack for breeding mules should be

Sheep at the Government Experimental Farm, Potchefstroom.

very remunerative. There were approximately 13,300 donkeys in the Colony on June 30th, 1905.

Cattle.

The cattle-breeding industry has not made very great strides in the Transvaal, mainly owing to the outbreak of Rhodesian redwater, or, as it was formerly called, the East Coast Fever, which first made its appearance at Komati Poort and Nelspruit in the Barberton district in May, 1902. Heroic efforts were put forth by the Government Agricultural Department to assist in re-stocking the country after the depletion created during the period of hostilities, and in this direction the department endeavoured to improve the stock by importing Herefords and Shorthorns from Australia and America, as well as native cattle from Madagascar and the Argentine. High-class pedigree stock has also been imported from Great Britain and Europe. Amongst the stock diseases with which the farmer has to contend, those of rinderpest and Rhodesian redwater are the most serious. The former caused great devastation throughout the whole of South Africa during the years 1896 to 1898. The latter made its appearance after the war. The Agricultural Department, through the Government Bacteriologist, and the vigilance of the Veterinary Division, greatly assisted by the active co-operation of the farmers, is rapidly gaining the upper hand in the struggle with all the ordinary contagious diseases which are such a bane to the South African stock farmer. Most of these diseases, indeed, have either been extirpated altogether, or are thoroughly under control, and the deadly Rhodesian redwater is being gradually driven back.

A breed of cattle peculiar to South Africa and largely used in the Transvaal is the Afrikander, the origin of which is not clearly defined, but owing to the similarity in colour and build to those of Portugal, many are of opinion that they were originally imported from that country. In the early days of colonisation, when the first Europeans landed at the Cape, cattle were found in the possession of the Hottentots, and it has been conjectured that the herds now termed Afrikanders may have been brought down from Northern Africa by the natives, and have improved by the progress of time and surroundings. They are considered to be a distinctly pure breed, with their own characteristics, are very hardy, of vigorous constitution, and specially adapted to the veld. The Repatriation Department imported a large number from Cape Colony in 1903, to re-stock the country after the war, and from these fifty of the best were selected to form a basis for the carrying out of a scheme for breeding pure Afrikander stock. Mr. W. H. Struben, a great admirer of the breed, placed at the disposal of the Department some fine grazing land near Pretoria, rent free for 20 years, for breeding purposes. In this way this particular breed will be kept distinct, there will be no fear of it dying out by indiscriminate breeding, and it will develop its own distinctive qualities. The Afrikander cattle make very good trek (draught) oxen, are very muscular, and have great powers of endurance, being excellent beasts of burden for transport purposes in a climate such as that of the Transvaal. They will live on the coarsest herbage, can travel long distances in search of fodder, and will thrive where other cattle could scarcely exist. The Afrikander is not considered a first-class beef breed, being in no way equal to imported stock, and wanting in maturing and meat qualities. Although they have never been tried as a dairy stock, they are not lacking in quality as milkers, the yield being rich in butter fats, and there is every reason to believe that, by attention and good treatment in feeding, they will develop into good dairy cattle.

Several of the more progressive farmers of the Transvaal have for some time been importing Friesland bulls, which they crossed with Afrikander cows, with the result that their progeny proved equally as hardy as the Afrikander, but were heavier and bigger in bone; moreover, the cows were very good milkers. The milk is not so abundant as that of pedigree Frieslands, but is richer in cream. The bullock also is a very much better animal for slaughtering purposes than the Afrikander.

Sheep.

In the Transvaal there are three principal breeds of sheep—the Merino, Afrikander, and the Persian—the last two being non-wool-producing, and usually to be seen in the low-lying parts of the country, whilst the Merino is to be found in the mountainous districts and High Veld. The Persian is a black-faced fat-tailed sheep, and usually thrives in districts where the Merino fails. A large portion of the Transvaal could be adapted for sheep farming, the Merino being the most suitable breed. The districts surrounding Standerton, Bethal, Ermelo (west), and Wakkerstroom in the east, are the most favourable for that purpose. The Agricultural Department, under the administration of the Minister for Lands, is deserving of the highest praise for the excellent work done in the direction of improving the sheep farming industry of the Transvaal, which will also have a beneficial effect on other parts of South Africa. During the past few years the department has imported various high-class Merino rams from well-known stud breeders of Tasmania and Australia, which must soon have a marked effect on the flocks of the country. Shropshire Downs, Suffolk Downs, and Rambouillet Merino are also among the imported stock. Experiments have been made in crossing with the Afrikander breeds, and have been in every way successful at the stud farms established at Ermelo and Potchefstroom.

The one great scourge that is prevalent among sheep in the Transvaal is scab. Previous to the war no bye-laws existed which compelled the farmer to keep his flocks clean. Now, however, he is endeavouring with the aid of the Agricultural Department to cleanse his flocks. A bye-law has been put in force to compel him to dip his sheep. Inspectors have been appointed to visit farms periodically, so that the time is not far distant when the entire country should be absolutely free of the scourge, and farmers recompensed by the additional value obtained for their wool. Many old-time customs of the Transvaal farmer are dying out, one of which is the kraaling of sheep at night (the sheep kraal being an enclosure with a low stone wall). The custom originated in the early days, as a protection from jackals and other vermin. This dispensed with, will conduce to the eradication of scab, which under the system of kraaling was undoubtedly propagated by the huddling of the sheep together. Sheep-sickness is another disease peculiar to the low-lying moist localities of the country, but the sheep recover upon being taken to higher altitudes.

Good prices have been paid by farmers on the High Veld for stud sheep, both rams and ewes. The stocking of this part of the country with Merinos is in every way satisfactory, as the country is well adapted to woolled sheep, and the risks from diseases are smaller and the returns quicker and more certain than from any other branch of farming. Those who should be in a position to judge are of opinion that from present indications the supply of Kafir goats and Persian and Afrikander sheep runs a risk of being overdone. They

are hardy animals, and can live on almost any veld, but they yield neither wool nor mohair, and for slaughtering purposes are quite second-rate, the fat being deposited unevenly, and the flesh being very light, especially on the legs. They are useful in country districts as a source of meat supply (of an indifferent kind), but they are bound later on to come into competition with improved mutton sheep, and to their detriment. Experiments made in Potchefstroom with recognised mutton breeds prove that they will thrive, and when crossed with Merinos or Afrikander sheep the offspring show a marked improvement in carcase. At the present time the wool produced in the Transvaal is not of a quality to realise a high figure either in the European or American markets. Australasian wools, especially of the Merino class, obtain the highest prices in the best markets, but with the help of the Agricultural Department of the Transvaal, and the assistance given by it to the farmers in enabling them to obtain good sound breeding qualities at reasonable rates, the flocks must improve. In the course of a few years Transvaal wool should hold its own in the markets of the world.

The Angora Goat.

The mohair industry has assumed considerable dimensions in the Transvaal. The Angora goat of South Africa is a cross breed, the progeny of rams imported from Persia, Turkey, and Asia Minor. The Turks and Armenians in ancient times developed an important industry by the manipulation of the silky fleece of the Angora goat into shawls, rugs, and carpets, which eventually attracted the attention of merchants of Western Europe. The Angora goat has proved to be very profitable to breed, in suitable parts of the Transvaal. It thrives best in a dry climate, and prefers to browse on leaves, twigs, and scrub bush, and upon grass on the stony hill sides. It is more sensitive than the sheep, owing to its delicate nature and fleece. Mohair has of late years been realising good prices, and at the time of writing one parcel of 600 bales fetched as high as 15d. per lb. on the sales at Port Elizabeth. Mohair is extensively used in the manufacture of lustre dress goods, and there appears every likelihood of that material coming into fashion, as its wearing properties cannot be excelled, the manufactured material always showing clear and bright. It has also the natural characteristics of absorbing and retaining all the best qualities of the dye liquid, this accounting for the fastness of shade in the class of goods mentioned. The product of the Angora goat should prove a very remunerative adjunct to the resources of the Transvaal farmers. In order to assist these it is proposed by the Department to remit half the cost of the railway carriage on breeding sheep and goats consigned from any railway station in South Africa to the Transvaal, the amount of such rebate not to exceed £20 to any individual farmer.

Ostrich Farming.

The ostrich is to be found in a wild state in some parts of the Western, Northern, and Eastern Transvaal. Ostrich-rearing is carried on successfully by several farmers, but the industry has not yet developed very

FIRST COMMENCEMENTS OF THE POULTRY DIVISION.

largely, owing to the prevalence of the jackals which destroy the birds. The western and north-western parts of the Transvaal, where the veld and climate are suitable, are the most favoured for the industry. The ostrich can be reared in districts unsuitable for cattle and horses. Ostrich-farming does not require much labour, and if a farm is well fenced all that is necessary is care in inspection of fences each morning, as the birds are occasionally caught in them when frightened by jackals or other wild animals, or by a thunderstorm, which generally causes a stampede. From 100 to 300 birds may be kept together in a paddock of 2,000 acres. A farmer having the capabilities for growing lucerne, with water and irrigable land, will find ostrich farming very lucrative. With lucerne on the land he can "graze" five birds to one acre per annum, and good ostriches will produce fully £5 to £7 each. Ostriches are very small eaters. About 3 lbs. of lucerne per bird daily is all that is required, and on that quantity they will keep fat and healthy without any other food. The first plucking (chick feathers) takes place when the birds are eight months old, the subsequent pluckings averaging about three in two years. The feathers are clipped at six months' growth, so as to catch them in full bloom, the quills being left in the wings. After two or three months the quill end dries up, is easily drawn out without giving pain to the bird, and makes room for new feathers. Birds should average about 1½ lbs. of feathers per year. The ostrich-breeding season (during which the cock birds frequently become very savage and dangerous) is usually from June to the end of September, and the period of incubation is about 42 days. Both the cock and hen birds take turn at sitting on the eggs, the hen by day and the cock bird by night. The hen is perfectly quiet and harmless when sitting, but the cock bird is exceptionally fierce at that time, and both are very savage after the chicks are hatched. Fully developed ostriches are usually allowed runs extending to 2,000 acres, with an average of 20 acres to a bird. One of the greatest difficulties with which the farmer has to contend is the tendency of the birds to become wild and unmanageable when permitted to run on the open veld. This tendency, however, is gradually becoming lessened, probably through years of domestication. Cattle grazing upon the land greatly improves the pasturage for the birds. Ostrich feathers always fetch a fair price, and the demand is likely to continue. It is to be regretted that nothing has been done towards establishing a small experimental ostrich run in some portion of the Government game reserves, where ostriches are still found in a wild state, and whence both chicks and eggs could be procured. A cross between the wild bird and the domesticated bird imported from the Cape Colony would probably be of great service in the Transvaal, as likely to become more readily acclimatised.

Poultry.

There are two Government poultry stations established in the Transvaal, one at Potchefstroom, the other at Ermelo—the former being on an extensive scale. The year 1904-5 was a most successful one at the Potchefstroom farm, upwards of 1,000 chickens being hatched during the season, over 140 settings of eggs distributed, and about 400 head of stock birds sold. In addition, some 130 head of birds were sent to Ermelo for stock purposes. During the breeding season of 1904 an epidemic of "dead in the shell" appears to have swept over the whole country, including also the Orange River Colony, Cape Colony, and Natal. The season of 1905, however, produced very satisfactory hatching results. There is an evident increase in the interest taken throughout the Colony in the poultry industry. The entries at the poultry shows held in Pretoria and Johannesburg in June, 1905, under the auspices of the Transvaal and the Rand Poultry Clubs respectively, were numerous, and the quality of the exhibits in most cases was very good. Two or three breeders have taken up turkey-rearing on a large scale, importing pens of first-class birds from England. One such breeder reared 200 head from eleven stock birds in one season. On the High Veld, where there is good grass and plenty of water, the breeding of geese and ducks is likely to prove very remunerative. The varieties in greatest demand for stock purposes are Embden geese and Pekin and Aylesbury ducks. Throughout the country there is a marked improvement in the class of stock being bred. It is of interest to note the following figures, taken from the official Customs returns, showing the quantity and value of eggs and poultry imported into and exported from the Transvaal during the year ending 30th June, 1905, as compared with the preceding twelve months:

The poultry expert at the Potchefstroom Experimental Farm strongly advises caponising for the purpose of improving the quality of table birds. He states that capons at six months will weigh from 1½ lbs. to 3 lbs. more than birds of the same age which have not been so dealt with, and that the quality of the flesh is also much improved by this process. It is probable that another branch of the poultry industry — viz., pigeon-breeding — would prove highly remunerative in the Transvaal Colony, though nothing has been yet done in that direction excepting where allied with other branches of farming.

Dairying.

This industry is one that has received comparatively little attention in the Transvaal, but there is no doubt that in the near future it will claim a large share. As the Colony becomes more settled, and the efforts to cope with, and ultimately to eradicate, stock diseases are meeting with greater success, so the facilities for producing milk and butter are distinctly on the increase. The imports of preserved milk, butter, and cheese are, however, still very large. In the country districts home-made butter is frequently met with, but as a rule its quality is anything but first-class, as it is full of butter-milk, and too greasy and wanting in firmness. Occasionally one may find really excellent butter in the country districts, proving that a good article can be produced in the Colony provided skill and care be exercised. A co-operative dairy, the first of its kind in the Colony, has been established at Potchefstroom, and it is understood that dairying is to be conducted at Ermelo on somewhat similar lines.

Cotton.

This important article of commerce is capable of being produced in certain portions of the Transvaal—namely, the low-lying or sub-tropical sections which include portions of the Zoutpansberg, Lydenburg, and Barberton districts, and it has also been demonstrated that varieties of the American Upland cotton will grow satisfactorily in the Middle Veld. Indeed, the cultivation of cotton has already commenced, and twenty-nine varieties of

IMPORTS.

	1903–4.		1904–5.	
	Quantity.	Value.	Quantity.	Value.
Eggs (dozens)	2,083,480	£130,895	2,166,936	£116,283
Poultry	275,725	48,583	397,292	62,521

EXPORTS.

Eggs	8,247	£748	10,415	£1,459
	(Six months ending June 30th, 1904.)		(Six months ending June 30th, 1905.)	
Poultry	670	£203	1,658	£1,026

American Upland, Sea Island, Egyptian, and East Indian cotton have been tested by the Botanical Department. The production at present is, of course, insignificant. Samples of the "Bohemian" variety of the American Upland submitted to the Cotton-growers' Association from the Zoutpansberg district were pronounced to be of a silky quality and of strong staple. In some cases these samples were valued from ·25d. to ·45d. per lb. more than the American-grown article. The highest valuations have been given to samples of the "Bohemian," "Russell's Big-boll," "Truitt's Big-boll," and "Excelsior." Some good samples of Egyptian cotton have been grown in the Low Country, but in the Middle Veld the frosts have injured this variety. "Sea Island" does not promise well, though it will probably succeed in the Low Country east of the Drakensberg. A sample of this submitted to Manchester was valued at 14d. per lb. As the returns will greatly depend upon the class and quality the Transvaal can produce, this report should be encouraging. Investigations concerning the industry were probably first made owing to the fact that native cotton exists in the country around Leydsdorp and Barberton. Specimens which have been inspected are the product of a climbing plant or vine, possibly indigenous to the Low Country, but more probably imported from America or India, or even from much further north, in tropical Africa, and since deteriorated. Other specimens are the true type of "Upland" cotton known in Georgia and New Orleans. It is conjectured that the natives at one time cultivated the plant throughout tropical Africa. These "native cottons" are, however, ·30d. to 1·55d. per lb. less in value than American-grown cotton. There are also varieties grown by natives of the Zoutpansberg, the seeds of which closely adhere, and this is known as "Kidney" cotton—supposed to be originally from tropical South America. Samples of this cotton have been sent to the Director of the Imperial Institute, London, and the report by an expert is favourable, the cotton being described as of good quality, and of a kind that with careful cultivation might be capable of great improvement. Mr. E. Gerber, Krabbefontein, Zoutpansberg, who collected the cotton from the natives, states that it can be largely improved by careful cultivation, and that at a kraal he had seen twenty trees, which the natives asserted had been bearing since 1894. Some of these measured 15 ft. across the branches, the tree itself being eight inches in diameter, and growing in a wild state. The Kaffirs stated that they picked cotton all the year round, the trees bearing continuously. In Swaziland good commercial cotton has been grown. It is proposed to try and induce the natives to grow it on their own account in Zululand, by supplying them with seed of approved varieties, and buying their picked product at a fair price. It is believed that in this way women and girls might be induced to grow at the kraals small quantities of cotton for sale, as they do mealies. If ever the cotton-growing industry becomes properly established it should be borne in mind that success will only be attained by the exercise of the greatest care in persistent and judicious selection, in order not only to maintain but to improve the grade of staple. There is a large section of the country now devoted to a scheme of game preservation, which would well repay exploiting in the direction of cotton-growing, and where the total absence of frost would entirely do away with one of the most serious drawbacks to

A Field of Cotton, Tzaneen Government Estate.

the success of this industry at higher altitudes. In this connection it is well to notice that the manager of the Government Experimental Farm at Tzaneen expresses himself very confidently in regard to the prospects of cotton-growing in the Low Veld (*Agricultural Journal* No. 14, January, 1906). "Cotton soil," he writes, "ought to be absorbent, but must be well drained. The plant prefers a porous soil to a more clayey one." Large areas of the Low Country would certainly answer to this description of suitable soil. The authority above mentioned considers it is not desirable to plant cotton on the best Low Country soils, as the plant attains an unnecessary height without a proportionate yield of fibre. The ordinary soil on the Tzaneen Estate is too rich; in the Zoutpansberg district, however, are vast areas of land suitable to cotton. Numerous experiments have been made with fibre-plants at Tzaneen, and sixteen varieties of cotton, including Indian, Egyptian, Sea Island, and all the best American sorts, with the exception of the Indian variety, gave promising results. The staple of the cotton grown was satisfactory, the lint ranging from one to two inches in length, and constituting about 30 per cent. of the seed cotton. During the year 1906 a cotton gin was to be erected on the estate, the use of which is to be permitted to farmers in the district, thus assisting them to tide over the experimental stage. A valuable fibre-plant of good growth, and very suitable for poor lands, is Sisal hemp.

HORTICULTURE.

The division of horticulture in the Transvaal Colony is sparing no pains to arouse the interest of farmers generally in fruit culture, efforts being mainly directed towards the development of Pomology and Viticulture. Experiments are being conducted at the various stations and on private properties, and advice is freely given to fruit-growers by means of lectures, interviews, and demonstrations. There is not wanting evidence that many people do not take this industry seriously, thinking that it is only necessary to plant the trees, irrigate them occasionally, and then gather the fruit when ripe. On the contrary, the industry is one requiring unremitting attention and skilful management. The general idea carried out upon the experimental stations in regard to fruit culture is that together they shall produce the entire range of fruits which may be expected to grow with success in the Colony. At Ermelo, with its temperate climate, currants, gooseberries, and other berry fruits, together with apples, pears, apricots, and plums, are cultivated. At Potchefstroom, in addition to these, figs, persimmons, loquats, and vines are represented, while at Warmbaths, oranges, lemons, bananas, pines, mangoes, and similar sub-tropical fruits are receiving attention. At Zeerust an effort is being made to demonstrate that it is possible to produce fruits of all kinds, both citrous and deciduous. The success attained hitherto on these stations has unquestionably aroused very great interest in the surrounding districts, and at pruning time the managers are besieged with requests for cuttings for grafting purposes. Japanese plums and apples seem to be the fruits most in demand. There is every prospect that within a few years a very large quantity of fruit will be produced within the Colony. Over-production will have to be carefully

guarded against, by planting only varieties that have an assured market either for canning, shipping, or drying. Cultivation and careful pruning and thinning of the fruit will ensure the production of a first-class article. It

fruit. An enormous quantity of these plums were sent to the Transvaal in the early part of 1905, from the Rhodes Fruit Farms and the Cape Orchard Company, from 7s. 6d. to 15s. per case of 20 lbs. being realised.

Orchards on the Government Experimental Farm, Potchefstroom.

is noteworthy that South Africa imports jams, fresh fruits, dried and canned fruits, to the value of about £200,000 in the course of a year, and there is no reason to anticipate any diminution in these imports until the country is able to supply the whole or a portion of what is needed, which with the steadily increasing population will probably not be for some years to come. The Transvaal is in a position to produce certain varieties of fruit which are in demand on the European markets, and to place them there nearly a month earlier than they can be received from Australia. Jam-making and canning is an industry with a future before it in the Colony, but at present unexploited. New ideas in regard to orange-growing are being steadily assimilated by many farmers, and there is a growing demand for new varieties. "It is an accepted fact," states the Government Horticulturist, "that throughout this sub-continent the Transvaal citrous fruits stand pre-eminent both for size, colour, and quality. This is attributable more to our soil and climate than to anything else, and I anticipate much better results in the future than have been attained in the past." A greater amount of planting has been done with Japanese plums than with any other

In the opinion of the Government Horticulturist there is a great future for pear production in the Transvaal, this being one of the hardiest and most profitable fruits. In connection with fruit-culture in the Transvaal Colony, the gentleman above quoted writes:— "The need of enterprising and progressive nurserymen in our midst is imperative, and I am hoping that the import restrictions which were approved at the Congress of Entomologists and Horticulturists recently held at Pretoria will induce some of our fellow-colonists, either from South Africa or beyond sea, to come here and open out in this line of business." In the Zoutpansberg, oranges, naartjes, sweet and sour lemons, limes, and shadock are grown to great perfection. On the Government Experimental Farm at Tzaneen crops have been exceptionally heavy. Fruits belonging to a more temperate climate, such as apples, pears, peaches, plums, apricots, and cherries, have not thriven so well. Sub-tropical fruits, including bananas, mangoes, pines, grenadillas, almonds, dates, olives, guavas, alligator pears, papayas, and pomegranates, have been reported upon as doing extremely well at Tzaneen, as also mulberries, quinces, loquats, pawpaws, and avocado pears. It was the intention of the management, if better transport facilities were not afforded in the near future, to erect a jam-making and canning plant on the estate.

THE TOBACCO GROWING INDUSTRY.

Tobacco-growing in the Transvaal is not a new industry, but has been carried on for many years by the Dutch farmers, and the superiority of their product over that grown in any other part of South Africa may be looked upon as generally acknowledged. At the commencement the farmer grew tobacco for his own consumption, but soon discovered its commercial value. The original method of dealing with the leaf for sale was to manufacture it into rolls of various sizes, but roll tobacco is now becoming less common, as it does not command such a ready sale as formerly. Later on the large planters took to cutting their leaf, and this practice to a considerable extent still continues. The latest stage so far reached is the sale of the leaf to local manufacturers who turn out various brands of unadulterated and unflavoured tobacco, both light and dark. Of these, the pipe tobaccos of the Rustenburg district, generally known as "Magaliesberg," are most in favour. Although much tobacco is grown in other districts of the Transvaal, Rustenburg may be looked upon as the centre of the industry. The tobacco grown on either side of the Magaliesberg range differs considerably; a light tobacco is produced on the northern side, and on the southern a dark tobacco. The latter is principally manufactured into a very dark pipe tobacco, the main character of which is obtained by machine cutting when the leaf is very wet, followed by "sweating" to a high temperature for some 24 hours. The process is completed by drying on sails in the open, and ageing in large bins. The brand manufactured by Messrs. Hartley & Sons is perhaps the best example of this class of tobacco, which commands a large and increasing market. The Rustenburg district has not to any extent produced cigar and cigarette leaf, although there are isolated cases of cigar manufacture on a small scale. Most of the tobacco grown is quite unsuitable for cigars, although in some districts likely red sandy loams exist upon which cigar leaf could probably be grown.

The Marico district, which adjoins Rustenburg to the west, possesses a large variety of soils and climatic conditions favourable for tobacco culture.

The industry is not yet much developed, and very crude methods of cultivation and treatment for the most part are practised. A good pipe tobacco will in future be produced in many parts of this district, whilst cigar and cigarette leaf will not be altogether neglected.

Right away to the east is the Piet Retief district, which of late has been coming somewhat to the fore as a tobacco-producer. The leaf has characteristics distinct from that of both the Rustenburg and Marico districts, and that grown on the low-lying lands has an undoubted future. Some excellent tobacco is also produced in the Lydenburg district.

The district of Barberton, including the De Kaap Valley, produces a strong pipe tobacco. Fine samples of cigar leaf from this district have been exhibited, and similar results are anticipated from other districts.

The Waterberg district produces a good pipe tobacco, and the prospects for cigarette leaf on its sandy soils are excellent. In this district there are also hundreds of acres of fine red loam — notably around Potgietersrust — which is eminently suitable for the production of a high-class cigar leaf. Present indications and future prospects in certain portions of this district are distinctly encouraging.

The Zoutpansberg district offers the greatest variety of soils and climatic conditions of any district in the Transvaal. The higher-lying plateaus produce a good pipe tobacco, whilst the Low Country has been proved capable of producing a good cigar and cigarette leaf. The Government owns large plantations at Tzaneen, where decided progress has been made, but the public are apt to demand at once at a low price an article equal to world-famed products. Other countries have taken a generation or more to develop similar industries, and have made use of all the advantages of modern science in doing so: whilst in the Transvaal science is only just beginning to be harmonised with practice.

The tobacco-growing industry of the Transvaal is in its infancy so far as the development of an export trade is concerned. That such a trade can be developed is the opinion of many competent judges, but the needs of smokers other than those living in South Africa must first be studied, markets and their requirements investigated, and the whole matter treated in a thoroughly businesslike manner. There are signs that the industry is being seriously taken in hand at last. The Government is establishing a Tobacco Division of the Agricultural Department, and is importing practical experts from other tobacco-growing countries. These men will pay farm-to-farm visits, and scatter knowledge by means of practical demonstration. The right varieties of seed for the various soils of each district will be selected and distributed, statistics collected, and much work done of a practical and useful nature. To aid the efforts of the Government, the Transvaal Tobacco-growing Association has been formed by private enterprise, with Lord Selborne as President. The object of this Association is to develop the commercial side of the industry by a thorough investigation into the conditions of the tobacco markets of the world, by aiding the co-operation of the tobacco-growers of the Transvaal for the purpose of supplying such markets as are likely to prove profitable, and by forwarding the organisation and progress of the industry generally. It is estimated that about 5 per cent. of the leaf now produced would find, if properly treated, a profitable sale outside South Africa.

A Tobacco Plantation in Piet Retief District.

The very excellent results achieved in the Transvaal from the cultivation of tobacco decided the management of the Tzaneen Government Estate to pay special attention to this branch of tropical agriculture. The planting season for tobacco commences early in September, and continues to the end of February. During 1903-4 the output of cured tobacco leaf from Tzaneen was 40,000 lbs. The following year was an exceptionally dry one, weather conditions being altogether unfavourable for tobacco culture. The late planting, however, was fairly successful, and, although the crop was far below the average, it was estimated to total from 25,000 to 30,000 lbs. The output for 1905-6 was estimated at 75,000 lbs. The machinery to be erected as the result of a European and American tour of inspection by the manager in 1904-5 includes the most modern and complete plant for the manufacture of cut, roll, and plug tobacco, and the making of snuff, cigars, and cigarettes. Imported tobacco seeds, grown on Tzaneen, have produced a cigar which has been very favourably received on the markets of the Transvaal, and the same may be said of the cigarette experiment. European tradesmen are employed in the cigar factory, natives being engaged at fixing and labelling the boxes. There is less endeavour to imitate the flavour of well-known brands than to establish a Transvaal speciality, of sufficiently good quality to hold its own in the markets of the world. The cigarette manufactured at Tzaneen is considered by competent judges to be superior in flavour and aroma to the ordinary American cigarette. The Tzaneen factory acts in co-operation with the entire tobacco-growing industry of the Transvaal, two thousand packets of tobacco seed of different varieties having been despatched from the Estate to all parts of the Colony, for co-operative experiment, during the last sowing season. The "Boer tobacco" properly belongs to the Virginian type. For cigar manufacture, Florida-grown from Cuban seed, Zimmer's Spanish, Florida-grown Sumatra, and Connecticut have been found to be the most suitable and successful for Transvaal culture. The

VIEWS ON F. H. HARTLEY & SON'S MAGALIESBERG TOBACCO ESTATE.

Mill and Tobacco Factory on the Hartley Estate (destroyed during the War). The present Tobacco Factory (to be increased to double the size by the addition of new buildings now in progress). Ploughing the Land. Tobacco Plantation. Shed for drying Tobacco Leaf. Boers bringing in Tobacco for Sale

VIEWS ON F. H. HARTLEY & SON'S MAGALIESBERG TOBACCO ESTATE.

Tobacco being sun-dried. Wagon, showing method of loading Tobacco before the War. Present mode of loading-up the Tobacco. Hartley's Tobacco being packed in the lead-seal bags in the Factory. Natives cleaning out a Watercourse on the Estate. View from Hartley & Son's Tobacco Factory (showing Tobacco drying in the sun).

managership of the Tzaneen Estate is for the time being connected with the position of Government tobacco expert for the Transvaal, to ensure due attention, assistance, and advice being afforded to tobacco-growers throughout the Colony. When practicable, a Government expert will be appointed. This official will reside in a central position, and will devote his entire attention to the tobacco industry.

Messrs. F. H. HARTLEY & SON'S TOBACCO ESTATE.

The founder of the firm of F. H. Hartley & Son was the late Mr. Frederick H. Hartley, who died in Johannesburg in 1902. This gentleman arrived in the Transvaal with his father when quite a lad, and at a later date laid the foundation of the Transvaal tobacco industry with which the name "Hartley" is now so intimately associated. The factories of the firm are situated in the Magaliesbergen, a mountain range that gives its name to the Rustenburg tobacco-growing district. The Magaliesberg tobaccos are admitted to be the best produced on Transvaal soil. The works and premises of Messrs. Hartley & Son were totally destroyed during the war, and the task of subsequent re-construction was costly and tedious, but since the resumption of business the firm has placed the industry on a footing it never before attained. The value of the output of tobacco from the manufactory in 1905 exceeded the combined output of the years 1894-99 by £10,000, the amount of tobacco handled being a quarter of a million pounds' weight in excess of the amount produced for market in the period mentioned. In the busy season—that is, at the time crops are being purchased—upwards of 100 workmen are employed on the estate of Messrs. Hartley & Son, which is some 12,000 acres in extent. The factory is situated on the banks of the Magalies River, to the south of the mountain range. A 50 h.p. turbine, driven by the waters of the river, works machinery cutting tobacco leaf to the amount of 50,000 lbs. per day. In the early days of the industry it was possible, with relays of natives, two at a time turning the handles of the machines, to get through from 12,000 to 15,000 lbs. daily, and such a day's work would be considered a heavy one. A steady increase in the output has been shown year by year since 1880, at which time the industry was in its infancy. With the opening up of goldfields in various parts of the country a great impetus was given to the tobacco trade of the Transvaal. The greatest improvement before the war was visible from 1897 to 1899. At the present time the tobacco industry is progressing by leaps and bounds, and everything points to a prosperous future for those interested in the trade. Messrs. Hartley & Son anticipate that ere long the name of the firm, and the brand of tobaccos with which it is associated, will be as well and widely known in the markets of Europe and the British Colonies as they already are in South Africa. As indicating the wide range of popularity gradually being attained by Messrs. Hartley & Son's tobaccos, a letter received from the office of the Premier of New South Wales (the Hon. J. H. Carruthers) may be quoted. The communication was addressed to Mr. Valder, Commercial Agent for New South Wales, Capetown, and was as follows:—

Premier's Office,
Sydney,
March 7th, 1906.

Dear Mr. Valder,

The Premier has become considerably impressed with the merit of a South African (Boer) tobacco, the brand of which, taken from the bag, is given on the accompanying slip. By Mr. Carruthers' direction I am addressing you for the purpose of asking you that you will be so good as to procure and ship to Mr. Carruthers' address a parcel of 10 lbs. of the weed.

Our Fisheries Superintendent, Mr. Dannevig, and I would also patronise the tobacco, and would like 20 lbs. sent; that would be a total of 30 lbs. in all.

With thanks beforehand for your anticipated courtesy,

Believe me, faithfully yours,
E. P. HARKNESS,
Premier's Secretary.

George Valder, Esq.,
Commercial Agent for New South Wales,
Capetown, South Africa.

(The tobacco referred to was from F. H. Hartley & Son.)

The name of Hartley is also known in connection with the first discoveries of gold in Matabeleland. Mr. Hartley, sen., and his sons frequently explored the then almost unknown territories of Rhodesia, on hunting expeditions, and the family is in several instances mentioned by Mr. Thomas Baines in his works on African travel. The Hartley Hills, in Rhodesia, are so called as the last resting-place of one of the sons of the sturdy old pioneer, whose name is known throughout the length and breadth of the sub-continent.

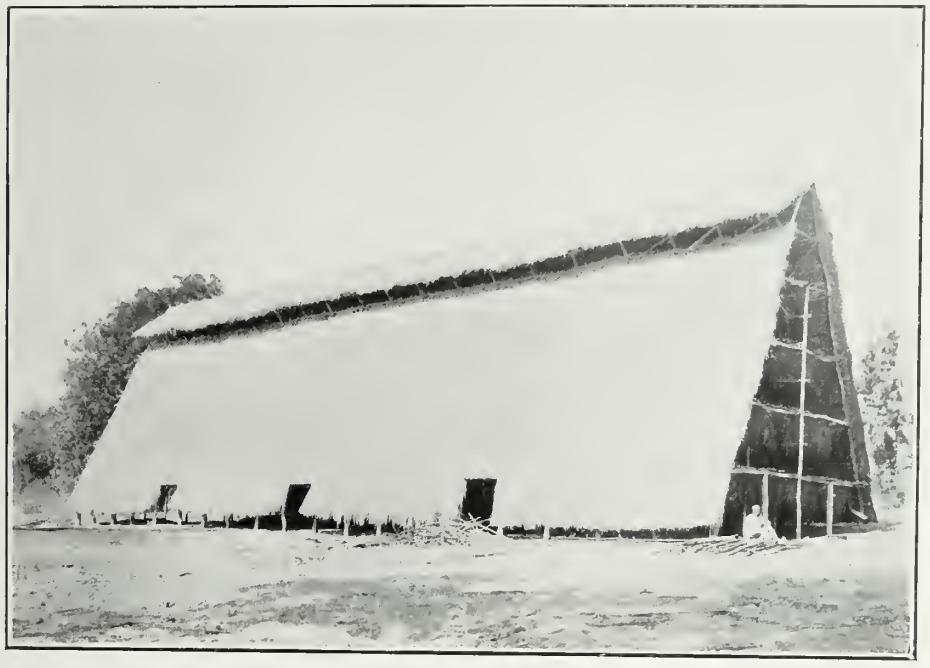
Waterfall on the Ramadipa, Tzaneen Estate.

THE TZANEEN GOVERNMENT ESTATE.

The Tzaneen Estate is situated in the Zoutpansberg district, near the Great Letaba River, at an altitude of from 2,500 ft. to 2,800 ft. above sea level. It is well watered by the Magoeba, Waterval, and Valsch Rivers. The property, which was purchased from the Thabina Farming Association, Ltd., in 1903, comprises about 6,000 acres. The climate is sub-tropical, and the soil rich alluvial. The average yearly rainfall for a period of ten years was 55 inches, but as much as 73 inches has been registered in one year. The Estate is intended as a practical and theoretical training ground for British settlers. Its physical features, climatic conditions, and admirable situation offer wide scope for the development of tropical and sub-tropical agriculture.

1. Preserved natural Timber, converted into Mazita Park, in which are nurseries for tropical and commercial plants.
2. Tobacco Seed-beds sheltered from the sun.
3. A Field of young Tobacco Plants.
4. A Field of "Hester" Tobacco.
5. "White Burley" Tobacco.
6. A Field of "Zimner" (Spanish) Tobacco for Cigar Leaf.
7. Tobacco Fields (120 acres); 10 different varieties of Tobacco.

It is the intention of the Government to allot about two-thirds of the Estate, and some 6,000 acres of the adjoining Crown lands, to suitable students, thus gradually forming a colony of settlers, with central factories for the treatment of tobacco, fibre, fruit, and other products, on a co-operative basis. Researches and experiments are conducted in respect to the cultivation of many plants and trees of domestic and commercial value to the country at large. Settlers and farmers are encouraged to seek any advice that can be given, and also to inspect the works on the Estate. Up-to-date machinery for the cotton and tobacco industries has been imported, all being driven by electric power generated by a turbine on the strong, steadily-flowing Magoeba River, the same power furnishing the electric lighting. Forestry is extensively carried on, there being 55,366 trees planted on the Estate in November, 1903, and 103,991 up to June 30th, 1905. The principal trees grown are the better classes of eucalyptus, acacias, casuarinas, cypresses, silver oaks, and black wattles. Enormous growth is evident with nearly all classes of timber, some of the eucalyptus trees having attained a height of upwards of 100 ft., with a girth of 5 ft. 6 in. at three feet from the base. Bamboos and Spanish reed are remuneratively grown. Great care is exercised in preserving valuable indigenous timber, the seeds being collected for the nurseries. Experiments have been in progress with bay trees, camphor trees, ginger, cassava, sugar cane, &c., and in 1906 it was intended to make trials with cocoa, vanilla, kapok, cinnamon, and liquorice. Soy beans, Florida velvet beans, cowpea, teosinte, rice, and sugercorn answer very well. Lucerne and indigo are also under trial and observation. The average yield of maize is 50 bushels (at 56 lbs.) to the acre. About 150 tons of hay are harvested yearly. In addition to cotton culture, fibre plants, with which experiments have been conducted, are ramie, papyrus, Mauritius hemp, and *Musa strelitzia*. Coffee culture was temporarily checked by the appearance of "rust," caused by a leaf fungus; experiments, however, were continued with it in shaded localities. Tea has been grown on the Estate since 1898, and in six years the bushes had reached a height of 16 ft. They were afterwards pruned down to 18 inches, and made vigorous and healthy shoots. Ninety pounds weight of the best indigenous Assam tea-bushes, and of six choice Indian hybrids, have been ordered, and ten acres are to be set with 25,000 plants. In addition seed is distributed to progressive farmers in localities where tea can be successfully planted. Experiments are also conducted with rubber trees and vines. Para rubber trees thrive well.



A Tobacco-drying-shed on the Estate.

The syllabus of instruction at the Tzaneen Government Estate is as follows:—

1. General farm management, comprising preparation of dry and irrigable land, ploughing, principles of drainage and irrigation, cultivation of ordinary farm produce, rotation of crops, green manuring, hay-making, farmyard manures, and commercial fertilisers, ensilage, farm-roads and bridges, fences and gates, types of soils, plant breeding, and weeds and their eradication.

THE ORCHARD.

1. The Manager's House.
2. Tin-making Department.
3. Pocketing Room.
4. Interior of Tobacco-drying-shed.
5. Curing and drying Plant.
6. Hydraulic Presses.
7. Flue curing and drying-shed for Tobacco, American style; process of drying, 100 hours.

2. Tobacco culture, comprising the complete course, from the selection of seed to the curing and manufacturing of the leaf for market, cigar-making, and the preparation of cigarette and pipe tobacco.

Some Tropical Fruits grown on the Estate.

3. Fruit culture, comprising general nursery and orchard management, crossing and hybridising, propagation of plants by seed and cutting, grafting and budding, spraying, pruning, fumigating, fertilising, harvesting, packing, marketing, drying, and preserving.

4. Agriculture and economic products, including the propagation, planting, pruning, spraying, and harvesting of commercial crops (coffee, tea, cotton, etc.), fibre plants, oil plants, food plants (cassava, arrowroot, etc.), palm plants, dyes, spices, and drugs.

Some of the Students' Rondavels.

5. Forestry (including practical work in the propagation of indigenous and introduced timber trees, study of their habits and economic values, formation and care of windbreaks and shelter belts, the laying out of nurseries, and the profitable management of forest plantations).

6. Experimental work.

7. Blacksmithing, carpentry, and masonry.

Students are required to pay a premium of £60, to cover cost of board and lodging for one year. All instruction is free, but those who desire to take up the course must be approved by the Colonial Secretary. Suitable dwellings are provided, each accommodating two students. It is proposed to accept 20 students each year, giving them one year's course of instruction. Those who prove efficient are offered holdings on the Estate, under the terms of the Settlers' Ordinance of 1902. Those who complete their course to the satisfaction of the manager, and who prove capable field and experimental workers, are entitled to a certificate, and on the termination of a two years' course to a diploma signed by the Commissioner of Lands. At the commencement of the course each student must produce a satisfactory guarantee that, when accepted as a planter, he will have sufficient capital (not less than £500) at the end of the year, with which to take up his holding.

A Tea Bush.

IRRIGATION AND WATER SUPPLY.

The work with which this department has to deal consists of: (a) The drawing up and execution of schemes for storing and utilising flood waters; (b) the drawing up and execution of schemes for utilising perennial streams the flow of which runs to waste: (c) the investigation and record of observations of hydraulic phenomena: (d) the boring for and utilisation of subsoil water for agricultural purposes; (e) the drawing up and execution of schemes for the water supply of towns. The staff of the Department, which is controlled by a Director of Irrigation, comprised, on the 30th June, 1905: Engineers (13), boring branch (3), draughtsmen (5), clerical staff (14), miscellaneous establishment (4); total, 39. This is an increase of seven over the number on the staff on the same date in 1904, there being one more each in the boring branch and drawing office, three more on the clerical staff, and two more on the miscellaneous establishment. In addition, three assistant engineers and one surveyor were engaged temporarily; chainmen, levellers and temporary draughtsmen were employed as required, and gauge-readers were appointed as the various hydrographic stations were fixed.

A three-year-old Coffee Tree on the Tzaneen Estate, in full bearing: yield, $3\frac{1}{2}$ lbs. cured Coffee Beans.

The only work in actual operation during 1904–5 was the Potchefstroom Government Canal, which was opened for irrigation purposes in May, 1903. Some difficulty arose in connection with the working of this canal, owing to the want of a definite arrangement as to the supply which it was entitled to take from the Mooi River, and to the fact that the land which it occupied was not vested in the Department. These matters have since been arranged. The canal commands an area of 809 acres of the Experimental Farm at Potchefstroom, and 1,936 acres of the Mooibank Settlement, but owing to the small supply of water available from the canal, the irrigation of these areas was deficient.

The only irrigation work under construction on June 30th, 1905, was the White River Settlement canal. The contract for the earthworks on this undertaking was let in June, 1904, and work was commenced on the 23rd of that month. With the exception of maintenance by the contractor, the canal was completed on April 15th, 1905. Water was admitted on May 12th, and the supply has since been passed down to the settlers as required. The estimated cost of the work was £16,617, distributed as under:—

	£
Weir and head regulator	715
Ten miles of excavations	5,148
409 ft. of trough aqueducts ..	5,245
Five canal dams	946
Four flood escapes	440
Miscellaneous works	3,384
Distributaries	739
	£16,617

All of these works were practically completed at the end of June, 1905, with the exception of miscellaneous works and distributaries, within the estimated cost. The extension of the White River Settlement canal has since been under completion. Its estimated cost is £7,249; its length is 4·8 miles, and it will command an irrigable area of 937 acres in the Settlement. Pipe and masonry outlets are provided with distributaries leading therefrom on to the lands to be irrigated. Owing to the great fall of the ground it is necessary to provide pitched rapids at the tail of the extension. The length of this canal is 14·8 miles, and the total area commanded by it 2,655 acres.

THE WHITE RIVER SETTLEMENT, BARBERTON DISTRICT.

The principal work of the department during the year was the survey and preparation of plans and estimates of proposed works which were considered likely to result in successful irrigation schemes. It was hoped that the most promising of these would be selected for construction. The projects submitted for consideration were five in number, including that of the White River canal, already referred to.

The Intake, White River Irrigation Scheme (showing new Automatic Rain Gauge).

In connection with the Great Letaba River it was proposed to construct a masonry weir across the river with a canal leading therefrom on the right bank. The weir proposed will have a maximum height of 14 ft. and a crest length of 200 ft., and will be founded on rock. The canal will lead off from headworks on the right bank, will have a length of eight miles, and a discharge of 35 cubic feet per second. There are to be 13 trough aqueducts, with 1,100 ft. of iron fluming, and 17 canal dams at the crossings of spruits. The irrigable area is extremely fertile, and suitable for the growth of sub-tropical crops, one of which (tobacco) will supply the Government tobacco factory at Tzaneen with the raw material required. A careful survey of the river in the vicinity of the selected site, of the canal line, and of the irrigable area was made, and its revision with a new site for the weir was completed in April, 1905. Designs and estimates had therefore to be prepared for two schemes, and the one providing the cheaper site for the weir was selected.

Another suggestion is the construction of a small storage reservoir by means of an earthen dam on the Plat River, with a small channel led from a pick-up weir. The dam is to be situated 2½ miles north-west of Warmbaths, and will have a length of 743 ft., and a maximum height of 66·25 ft. The storage capacity will be 63,000,000 cubic feet, but it is anticipated that the reservoir will fill more than once a year, thus impounding a much larger quantity. The water will pass through a masonry outlet, flow down the Plat River for 1½ miles to a pick-up weir, and thence by a small channel will be led for about five miles to irrigate land in the Hartingsburg Settlement. The better of two sites for the dam was selected, and the capacity of the reservoir ascertained. The canal line has since been fixed, and the irrigable area determined.

A fourth idea is the re-construction of an earthen dam on the Makwasi Spruit, near Wolmaransstad, with a small channel leading from it. The dam was built, prior to the war, by the Government of the South African Republic, but the design was faulty. The proposed re-construction will increase the storage capacity by 42 per cent. The dam is to be 3,610 ft. in length, with a maximum height of 38·5 ft. On the left bank will be a

waste weir of greatly increased discharging capacity, and a new masonry outlet on the right bank, from which a channel 2½ miles in length will be led to irrigate the Wolmaransstad town lands. The site of the dam was surveyed, the reservoir capacity ascertained, the canal line fixed, and the irrigable area determined, in November, 1904.

Another scheme is the construction of a small storage reservoir with an earthen dam on a spruit north of Schweizer Reneke, having a channel led from it. In this instance the the dam will be 1,290 ft. long, with a maximum height of 54·22 ft. The site chosen is that selected by the Republican Government prior to the outbreak of hostilities, when work had been just commenced. All the necessary preliminaries were concluded in November, 1904.

The following estimates were completed during 1904–5, and their detailed plans prepared :—

A storage reservoir with an earthen dam on the Mooi River, about two miles above Potchefstroom, to develop the existing irrigation, and to increase it by an extension of the Government canal. This dam will store the flood and waste water of the Mooi River for use in the dry season, will be 5,905 ft. long, with a maximum height of 58 ft., and a waste weir on the right bank will provide ample discharge for flood water. There will be a masonry outlet on each bank. The present Government canal is to be extended from 9¾ miles to 16 miles. A sufficient water supply will be assured to the town and Witrand canals, and to the furrows of riparian owners. In order that the dam might be located on solid rock, twenty-four trial pits and boreholes were sunk on and near its finally selected site. Owing to the proximity of dolomite, the utmost care was necessary in carrying out investigations, so as to avoid this dangerous formation. The dam will rest on solid diabase, thus ensuring a sound foundation, and the interception of the underground flow through the dolomite which underlies the reservoir basin. The estimated cost of this work is £153,395, and the capacity of the reservoir 743,000,000 cubic feet.

General View, White River Irrigation Canal.

Canal and Flume, White River Irrigation Scheme.

At Oliphant's Poort it is proposed to construct a reservoir with a masonry dam on the Hex River, and canals on each bank. The length of the dam will be 349 ft., and it will have a maximum height of 125 ft. above the foundations. A waste weir 150 ft. in nett length on the left bank, and thirteen 6 ft. by 4 ft. sluices through the dam, will provide for the flood discharge. The culturable area thus commanded will be 10,000 acres, and the estimated area rendered irrigable 7,500 acres. Soundings were taken all over the rock surface, sections for the dam made, and all survey work completed. The estimated cost is £173,240, and the storage capacity 1,196,000,000 cubic feet.

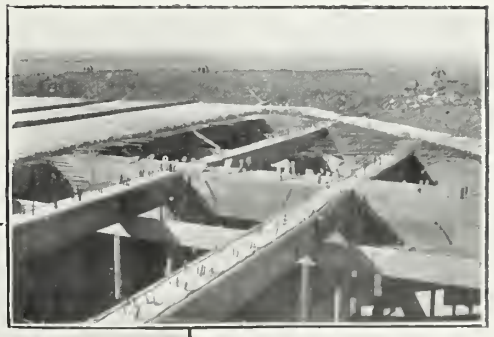
The cost, and particulars of construction have also been estimated for a storage weir on the Vaal River, nine miles above Christiana, with a canal or canals leading therefrom. It will take the form of a masonry weir with a total length of 5,560 ft. and a maximum height above river bed level of 31·42 ft. ; it will be built across the river, and will be founded on rock. The canal leading therefrom will command 17,000 acres of irrigable land on the Transvaal side.

BIG FLUMING OVER SPRUIT, WHITE RIVER IRRIGATION.

A careful survey of five trial sites for the weir was made, and the best one selected. The backwater will extend for 62 miles up the Vaal River and 16½ miles up the Vet River. The canal will have a length of 34 miles. All areas have been surveyed. The foregoing is an outline of the preliminary stages of the scheme. In its final stages it is estimated that it will command an irrigable area of 90,000 acres. Of this increased area 8,000 acres can be commanded in the Orange River Colony, or, should the Government of that Colony not wish to participate in the scheme, the remaining 65,000 acres could be secured in the Cape Colony by an extension of the Transvaal canal. To provide the extra storage a moveable shutter crest 14 ft. in height is proposed; this will increase the storage capacity to 11,451,000,000 cubic feet. It is estimated that this extended scheme will reduce the rate per irrigable acre from £24·6 to £12·71. The estimated cost of the Transvaal scheme only is £419,319, and the capacity, in the preliminary stage, is estimated at 2,178,000,000 cubic feet.

Two other important surveys are projected. The first of these is a medium-sized reservoir at Klipkopjes, with an earthen dam, waste weir, and outlet for impounding the storm water of the White River, Barberton district; estimated cost, approximately, £25,000. The second is that of a medium-sized reservoir on the Schoonspruit above Klerksdorp, with an earthen dam, waste weir, outlet and canal; approximate cost, £100,000.

A series of reconnaissance surveys has been carried out for the purpose of acquiring a knowledge of the facilities which exist for irrigation in the inspected districts, with a view to proposing construction schemes. The absence of proper topographical maps has rendered this work more difficult than it would otherwise have been. The work so far carried out is as follows:—The whole of the Vaal River from near Ermelo to near Bloemhof has been inspected, and a longitudinal section of the river bed levelled for 532 miles. The object



Standerton Waterworks. Top of Service Reservoir, showing reinforced concrete work.

was to determine the best comprehensive scheme for irrigation from the Vaal. All possible sites for reservoirs, etc., were examined, and the most favourable ones selected for preliminary survey. A large portion of the report and most of the drawings were already prepared by June, 1905. The report, which has since been printed, forms a valuable record of the possibilities of irrigation on a large scale in the Transvaal and the Orange River Colony from the Vaal River, which constitutes the chief portion of their common boundary.

Two preliminary reconnaissances of the southern portion of the Crocodile River near Pretoria have been made, also of the Hex and Elands Rivers near Rustenburg. It was subsequently decided to make a more thorough inspection of the whole of the Crocodile River basin in order to obtain a record of the facilities afforded for the construction of irrigation schemes. So far as the survey had gone by the end of the year under review, it was evident that the area of existing irrigated land could be largely increased by small works which could be undertaken by the farmers concerned. The party commenced its investigations on June 7th, 1905.

In June, 1904, and June, 1905, two expeditions were made to select reservoir sites on the Schoonspruit, and Taaibosch Spruit, near Klerksdorp. As a result, eight sites on the former, and four on the latter, were selected for preliminary survey, an estimate of £253 being sanctioned for the necessary works and transport. There is already a considerable amount of irrigation in the Schoonspruit Valley, and it is extending yearly. This extension, which is taking place above Klerksdorp, has caused a decrease in the available supply from the lower part of the river. Hence storage of flood water becomes essential, not alone in order to increase the area of irrigation, but to conserve such as already exists.

Flume over a Spruit, White River Irrigation Scheme.

On the Mooi River the existence of the dolomite formation above Potchefstroom precludes the possibility of constructing large storage works. The site adopted for the proposed Mooi River Reservoir is just north of where the railway crosses the river above the town.

During 1905–6 investigations were being conducted in the basins of the Marica River on the west, and the Oliphant's River on the east, thus practically completing the examination of the High Veld and Middle Veld areas.

For the purposes of the Hydrographic Survey, ganging weirs were constructed at twelve different places, at an approximate cost of £7,520. Self-recording weir gauges were erected at each. At thirteen places self-recording channel ganges have been constructed. The maker's price of the weir gauges is £65 each, and of the channel ganges £90; these prices include the standard, inlet pipe, and all accessories. In thirteen catchments rain ganges have been erected, numbering 44 in all, of which 11 are of the self-recording type, and the remainder ordinary 5 in. ganges. It is intended, as soon as possible, to replace some of the latter by self-recording ones. The self-recording ganges in use are made by Richard, of Paris, the European price being £18 15s. Observations show that the rainfall decreases westward from the Drakensberg, and that a considerable portion of it is intercepted by the Central Rand.

The Boring branch has carried on its operations chiefly in the area of the Springbok Flats. Three bore-holes were also sunk in the town lands of Zeerust, with the following results:—

No. 1 Depth, 226 ft. 9 in.; water supply, 1,500 gallons per diem.
„ 2 „ 102 ft. 1 in.; no water.
„ 3 „ 193 ft. ; water supply good, being inexhaustible with a pump drawing 4,800 gallons per diem. „

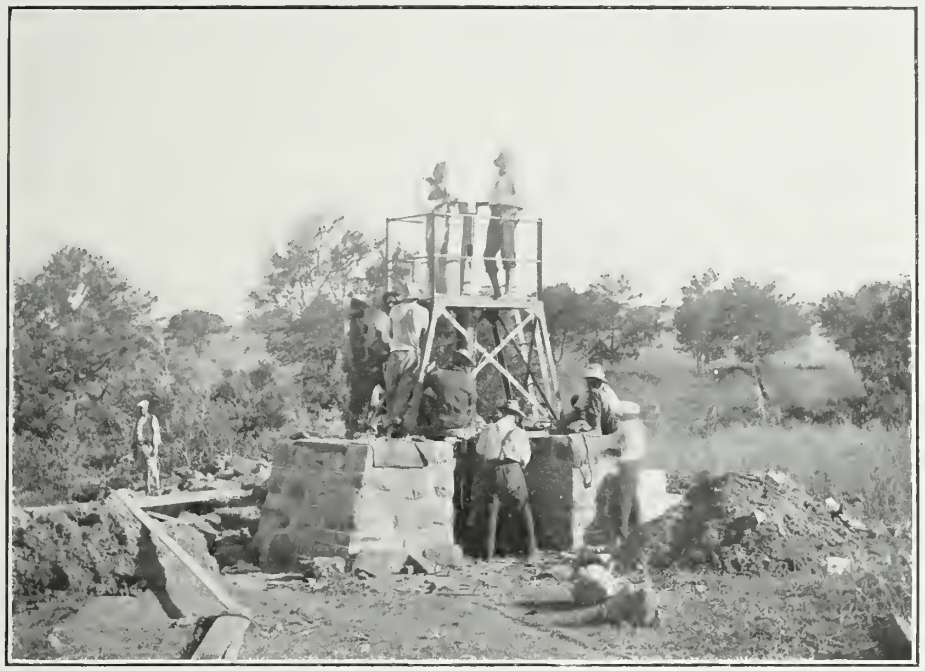
The first and third of these were commenced in 1903, and completed in July, 1904. They were bored for the purpose of supplying Zeerust with water, but the Town Council refused to take them over, the obstacle apparently being the outlay necessary to raise water from them. Attempts were then made to drill on Crown lands in the vicinity, but many difficulties were encountered. Beacons had been destroyed during the war, some of the selected farms had not been surveyed, a local surveyor was not procurable, and tick fever put a stop to transport operations. The attempt was ultimately abandoned, and the machines moved to Springbok Flats. In this area boring was confined to

Gauging Weir on Crocodile River, showing dry patching.

Crown lands, the farms selected lying to the east of Warmbaths. Altogether 19 bore-holes were sunk on twelve farms, the machines used being one $3\frac{1}{8}$ in. diamond (Cunningham & Gearing), and four 6 in. percussion drills (three Austin and one Clipper). Of the holes bored here during 1904–5, seventeen struck water, the total daily supply being estimated at 150,000 gallons. The other two holes were abandoned, but it is proposed to put down eight more in this area. Again, much difficulty was experienced in ascertaining the selected farms, as they were not surveyed, and further trouble was occasioned in connection with labour and transport. A principal object in confining the boring to this area was to train the staff, and to

Gauging Weir on Crocodile River, below Crocodile River Bridge.

obtain some knowledge of the geological formation and underground water conditions. The result has shown that water can usually be struck at from 100 ft. to 250 ft. from the surface over this large area of Crown lands. This points to the probability of the Government being enabled to place settlers on the land in the future. Two artesian drills have also been at work on this area. The one on the farm Ludlow, had, by June 30th, 1905, gone down 1,787 ft., and one on Diepsluit 1,420 ft. The first of these, with its subsidiary buildings, was erected on October 12th, 1904, and commenced working on November 15th, 1904; the other was erected on November 14th, 1904, and commenced working about January 15th, 1905. The object of this boring was to ascertain if artesian water existed on the Springbok Flats. This large area is surrounded by hills and high land, the surface is very absorbent, and very little rain water runs off it; in fact, some of the streams suddenly disappear underground. All this indicates the probability of the existence of a fair underground supply, but whether this will rise to, or near, the surface, as an artesian or sub-artesian supply, depends entirely upon the geological formation, which up to the present is not fully known. Boring operations were also conducted during the year at Bryntirion, near Pretoria: on the farm Weltevreden, district Zoutpansberg (the object of which was to obtain a water supply for the Pietersburg Municipality); and at Rietfontein Lazaretto, near Johannesburg. At Bryntirion, after great difficulties had been encountered, a water supply of 11,000 gallons per diem was obtained at a depth of 283 ft. 7 in. At Pietersburg a supply of 11,500 gallons was obtained at 48 ft.; a good supply, the amount of which was not ascertained, was also struck in another hole at 47 ft. At Rietfontein, a supply approximating to 16,000 gallons per day was struck at about 37 ft. in very hard quartzite, but it afterwards gave out. It was intended to sink further in another direction with a diamond drill. At Blauwboschkuil (Springbok Flats) no water had been struck at 345 ft., and the work was abandoned.



Gauging Weir on Pienaars River, at Hamenskraal, showing erection of Automatic Weir Gauge Recorder.

Boring operations for farmers will in the future constitute the principal work of the branch. A scheme for boring all over the Colony was given up as necessitating an initial expenditure of £54,195, which was prohibitive, and work was therefore at first limited to boring in the Standerton, Bethal, and Ermelo divisions, thereby reducing transport charges and supervision. Up to June 30th, 1905, no applications for drills had been received, in response to the notices issued to the Resident Magistrates. At the time of writing, all the 15 small drills were employed. The charges are payable in cash, at the rate of £2 2s. per diem while the drills are in steam, and £1 2s. per diem while they are in transit. For these charges, drills (and diamonds, when necessary) are supplied, geological advice given as to the most suitable sites for operations, and skilled foremen provided. The farmer has to provide transport, fuel, and water. The maximum number of the staff employed on Springbok Flats was six foremen and five assistants; and two foremen and one assistant were employed at the Mooi River Reservoir and Bryntirion. For the artesian drills two overseers and

Gauging Weir on Aapies River, at Dasport (Pretoria).

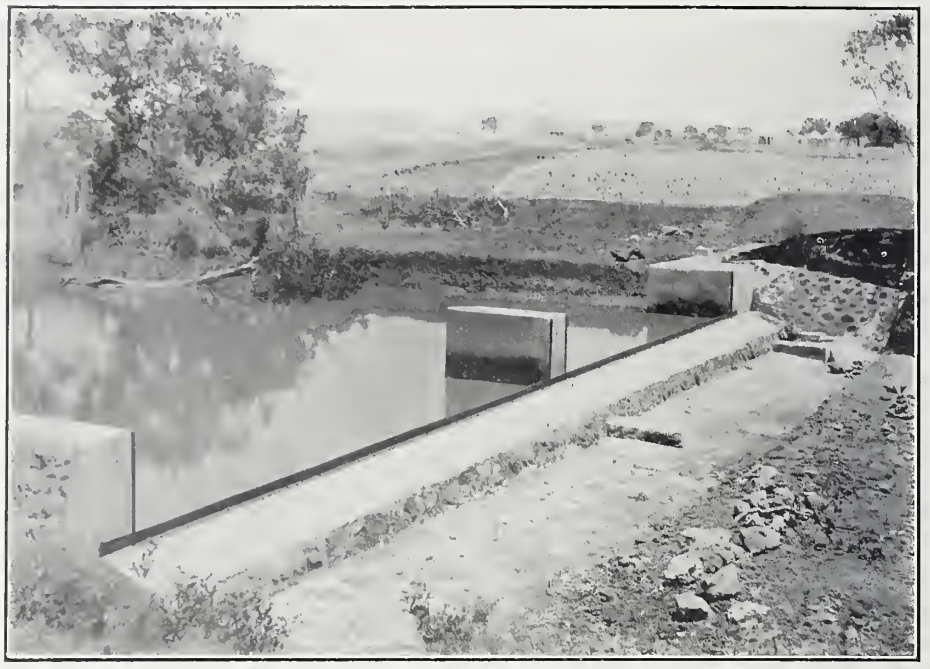
six runners were engaged. The average number of labourers on the artesian and shallow bores on Springbok Flats up to June, 1905, was three whites and 43 natives. The plant used by the boring branch at that date consisted of:

2 Sullivan "P" artesian diamond drills.
3 Cunningham & Gearing ordinary diamond drills.
6 Sullivan "H. N." ordinary diamond drills.
1 Star No. 1 percussion drill.
4 Austin No. 2 percussion drills.
1 Clipper No. 2 percussion drill.

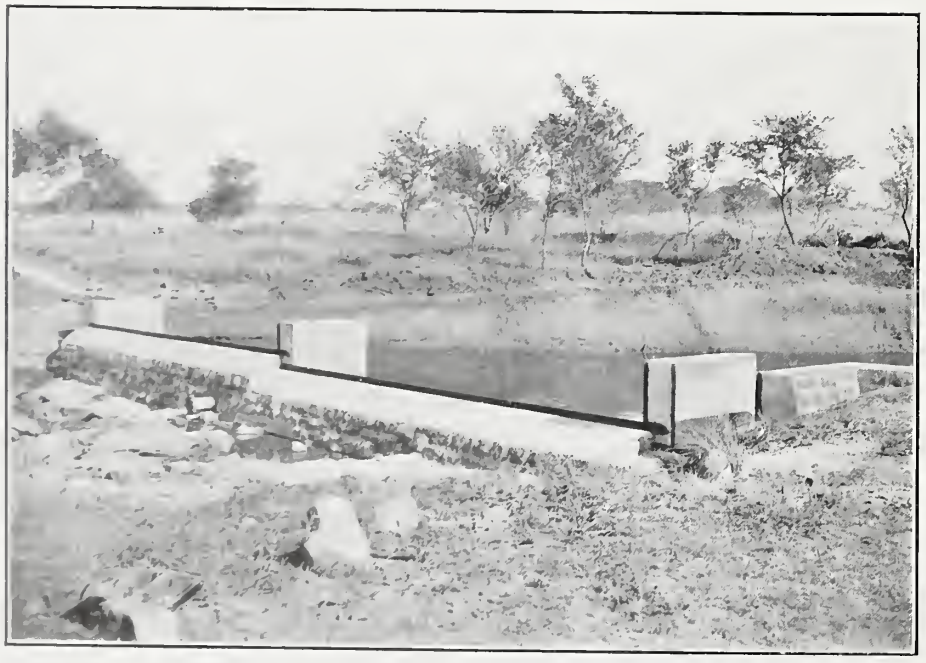
All are worked by steam, and are equipped with boilers, rods, implements, and moveable sheds for the plant and staff. Owing to the peculiar and hard strata prevalent in the Transvaal, diamond drills have proved more efficient and reliable than percussion drills. Brazilian "carbons" are used, and are "set" by a departmental setter at an approximate cost of 50s. a "crown," which includes a royalty of 10s. a crown paid to the Boring Engineer for his patent system of setting. Formerly the setting was done in Capetown or Johannesburg, the cost at the former place being £4 10s. and at the latter £5 a "crown."

During 1904–5, the Field Geologist made surveys of the Spingbok Flats, Western Transvaal, and the Standerton, Bethal, and Ermelo districts. Several farms were specially examined. Geological maps of the surveyed areas are in course of preparation for reference in connection with determining the probability of sites for boring, and the possibility of finding water.

Two important Commissions were appointed during the period under review. The Potchefstroom Water Commission dealt with the Mooi River Irrigation Scheme. It commenced its examination of witnesses on January 26th, and concluded it on April 18th, 1905. On January 16th, 1905, His Excellency the Governor appointed the Inter-Colonial Irrigation Commission to "inquire into methods to be adopted for the better conservation of the water supplies of the Transvaal and the Orange River Colony." It also dealt with the necessity for an alteration of the existing Irrigation Law (No. 11 of 1904). The Commission commenced its sittings at Johannesburg, which lasted from February 6th to February 25th, 1905. Further sittings were held elsewhere during the year.



Gauging Weir on Hennops River, at Zwartkop.



Gauging Weir on Pienaars River, at Hamenskraal.

A few publications have been issued in connection with the work of the Department, and a small professional library has been formed.

The following table shows the Budget items and expenditure of this branch of the Land Department during the year ending June 30th, 1905:—

Budget item.	Budget.	Expenditure.
	£	£
Salaries, wages, and allowances	19,700	15,018
Transport and travelling	—	—
Subsistence and personal charges ..	1,500	[2,445
Rail and coach fares and freight	3,500	348
Incidental expenses	300	133
Surveys and projects..	—	—
Boring branch. . ..	20,000	24,684
Hydrographic survey..	10,000	10,869
Preparation of water supply projects ..	6,000	16
Preparation of irrigation projects ..	10,000	3,563
Potchefstroom irrigation works	2,000	2,749
Investigations and Commissions	4,000	1,828
Drawing and survey materials	2,000	695
Tools and plant ..	4,000	1,779
Unforeseen expenditure	2,000	55
	£85,000	£64,182

Deducting a sum of £6,000 for appropriations in aid, from the total savings effected, the result is a nett saving of £14,818.

LOAN ACCOUNT.

	£	£
Artesian boring ..	16,786	16,752
White River Canal construction ..	16,617	12,311
	£33,403	£29,063

MISCELLANEOUS.

Standerton Waterworks	23,000	13,050
Grand total ..	£141,403	£108,295

PUBLIC WORKS.

DURING the financial year 1904–5 the control of the Public Works Department of the Transvaal was transferred from the Colonial Secretary to the Commissioner of Lands, and it was decided that, consequent upon the retirement of Lieut.-Col. Fowke, R.E., from the position of Director of Public Works, the technical responsibility for buildings and roads and bridges should be vested in the officers at the head of their respective branches. That for buildings was vested in the Chief Architect (formerly Superintending Government Architect), and for roads and bridges in the Chief Inspector. The Department thus became organised into three divisions, the Administrative, the Architectural, and the Roads and Bridges Divisions. The first-mentioned of these, placed under control of the Secretary of Public Works, consisted of the head office, the accounts branch, the estates office, and the mechanical and electrical engineers branches. The Architectural Division, under the Chief Architect, had its administration based upon centralisation. The buildings of the former district offices were closed, and the staff considered necessary for the divisional work was removed to Pretoria, supervision being carried out by travelling inspectors. It was further decided, in this scheme of re-organisation, that no work should be done departmentally, and the contents of the district stores, excepting such as were required by the Chief Engineer of Roads and Bridges and the Mechanical Engineer, were sold. The Roads and Bridges Division remained under the Chief Inspector, whose title was changed to Chief Engineer, Roads and Bridges, but the organisation of the Division remained practically the same. Representatives were retained in the headquarters of the former districts, excepting Johannesburg, and the Public Works Department stores and offices passed under the control of this division. A transport branch was formed under the Chief Engineer, Roads and Bridges, which was enabled successfully to deal with the provision of transport to Government officials, to enable them to perform their various duties. The Architectural division, therefore, was the most affected by the re-organisation. The principal reductions in the staff estimates were effected by charging the salaries of certain clerks of works and foremen to the cost of the works upon which they were employed. This arrangement, although theoretically the most accurate method by which to arrive at the actual cost of a building, was found quite unsatisfactory, and it was therefore decided to revert to the former system, a sum having been included in the Estimates to cover the salaries of the foremen of work who were not on the staff of the Public Works Department. In the Klerksdorp and Middelburg districts the concentration of the inspecting staff at Pretoria had to be abandoned. The effect of centralisation, and of doing work by contract only, has been that the votes for maintenance and small works have been more under control than formerly, but the delays caused by the increased amount of travelling, and the obtaining of tenders from local contractors for the small works, were found to be serious, and resulted in the retarding of work and of the passing of Bills. A considerable saving on these votes is anticipated, not because the money is not required, but because it has been impossible to get Bills passed for the works authorised. During the year under review the head office, being relieved of technical responsibility, was enabled to direct more attention to the compiling of proper registers of rent, rates, insurance, property, &c., the Department, during the first two years of its existence, having developed so rapidly that it was previously impossible to record these matters methodically. Proper registers have now been established. By a redistribution of rooms in Johannesburg a saving of over £3,000 per annum in rent for office accommodation was effected. These matters were dealt with by the Estates Office, and to this branch also were entrusted the negotiations for the purchase of "Sunnyside" (the Johannesburg residence of the High Commissioner) for £33,500, and the selection and the negotiations attendant upon the purchase of stands in private townships for Government purposes. The work entrusted to this office having now been satisfactorily accomplished, the duties hitherto undertaken by it are now distributed between the office of the Under Secretary, the Architectural Division, and the Lands Department. The Accountant's office deals with the collection of transport accounts. The amount collected averages £4,000 per month, and entails the monthly despatch of numerous accounts, and a great quantity of correspondence. The extra work entailed upon the Accounts Branch, consequent upon the abolition of departmental work, is great, but it has been simplified by the centralisation of the department, and no increase of staff has been necessary. The work of maintaining soldiers' graves has been dealt with by this division. This was commenced in 1903, and has been brought to a satisfactory state. In about 145 centres cemeteries have been formed and fenced in, and plans, sketch maps, and registers of each prepared, giving, where possible, all particulars of the men therein interred. Copies of these plans are supplied to all inquiring relatives, and to the Guild of Loyal Women, the members of which attend to the upkeep of the graves, and hold annually memorial services. A system of inspection has been organised, which ensures that in every case these cemeteries shall be kept neat and in proper repair.

The Electrical Engineering branch of the Department completed, during the period under review, the installation of electric light to houses at Bryntirion (the suburb of Pretoria where Government House is being erected), and the wiring of the Kafir hospital, the new wards in the Pretoria hospital, and many other important buildings.

During the same year the Architectural branch accomplished much useful work. Considerable progress was made with the building of the Lunatic Asylum, Pretoria. The administration block and the patients' blocks on either side were approaching completion on June 30th, 1905, and tenders were being obtained for the execution of further improvements. Building operations were well in hand in connection with the new Central Prison, Pretoria. A new clock tower and an upper storey were added to the General Post Office, Johannesburg, and a new post office was erected at Boksburg. The contract for the building of the new Telephone Exchange, Johannesburg, was let, and the work put in hand. This was being completed at the time of writing. For the Education Department sixteen buildings were erected, fifteen of these being capable of accommodating in all 3,859 children. They are as follows :—

Jeppestown, Bertram's, and Mayfair, in Johannesburg, and at Potchefstroom (Boys' High School). Krugersdorp, Volksrust, Wolmaransstad, Middelburg, Gezina (Pretoria), Klerksdorp, New Town and Old Town School, Randfontein, Vereeniging, Melville, Piet Retief, and Louis Trichard. In addition to these, several small ones were erected, together with a large number of farm schools throughout the Colony, accommodating in all about 4,500 pupils. For the Police Force, charge offices were erected at Booysen's and Doornfontein, barracks for "C" Division at Johannesburg, stables at Booysen's and Boksburg, married men's quarters at Krugersdorp, Boksburg, and Booysen's, and South African Constabulary Barracks at Nylstroom. For the Prisons Department, in addition to the large central prison in Pretoria, plans were prepared and contracts let for prisons at Pietersburg and Middelburg, gaolers' houses at Carolina and Belfast, and warders' quarters at Ermelo, Amsterdam, Belfast, and Carolina. Alterations and extensions to the amount of £3,300 were carried out in connection with the Johannesburg Prison. A large hospital was erected at Boksburg, and at Pretoria the Nurses' Home, single ward block, and double ward block, and the new native hospital were enlarged. At Bryntirion four Government houses and caretakers' quarters were erected, Resident Magistrates' houses at Nylstroom, Ermelo, Rustenburg, and Pretoria. The work done for the Agricultural Department comprised farm buildings at the Woodbush, manager's house at Irene, district veterinary surgeon's, forester's, and manager's houses, and farm buildings, at Potchefstroom, farm buildings and manager's house at Ermelo, manager's house at Standerton, forester's house at Lichtenburg, and forester's houses at Pan and Belfast. The work performed by the Roads and Bridges Division, including the transport branch, was very extensive. Everything points to the eventual necessity of materially increasing the expenditure on roads. Steam and motor-car traffic has replaced ordinary methods of late, and as the latter appears to be specially adaptable to a country such as the Transvaal, which is subject to so many kinds of animal diseases, the standard of road-making throughout the Colony will require to be raised. The mileage of roads in the Transvaal for which the Government is responsible may be placed at 6,500 miles, in addition to many by-roads over and above this total. The expenditure on this mileage has been, roughly, £140,000, or £21·53 per mile per annum. In carrying out road repairs, tram rails and trucks are becoming more generally used than formerly. Ploughs are also being utilised, and in certain cases the wheel-scraper has proved to be a labour-saving machine. Convict labour, hired from the Prisons Department, has been largely employed. An attempt at carrying out maintenance by contract has been made, but has not met with success. The local farmer, who is the only one in a position to undertake a contract for maintenance, has, in the opinion of the Chief Engineer of Roads and Bridges, "but very elementary ideas as to the material most suitable for repairing a road." Traction engines to run out metal, steam rollers, and steam crushers, have been given a fair trial. Their success depends entirely upon the cost of coal. When work is being done in the vicinity of a railway station a considerable saving is effected, but when working in outlying districts, where coal has to be carted, the cost of the work is considerably increased. There is only one "pont" in the Colony run under Government supervision, this is at Schoeman's Drift, on the Vaal River, the boundary between the Orange River Colony and the Transvaal. The Government ran this at a loss for some time, and it was then handed over to the control of a local resident, who undertook to supervise it and keep it in good working order. During the summer, and when the restrictions imposed as to removal of cattle during the prevalence of redwater were removed, it was anticipated that this pont would more than pay expenses, and would again have to be controlled departmentally. Meanwhile, it was principally used for transporting sheep, cyclists, and motorists across the river. Out of a total of 6,500 miles or more of recognised Government roads, 367/8 miles had been macadamised and heavily metalled, 777/8 miles gravelled, formed, had drained, 1093/4 miles formed, drained, and straightened, with but little gravelling, and about 400 miles roughly repaired, making a total dealt with during the twelve months of 624½ miles, or about 11 per cent. of the lowest possible estimated mileage. The general policy adopted was to thoroughly and permanently repair bad places, such as drifts, vleis, black turf, and sand, in the hope that in the near future it might be possible to join up these points by thoroughly formed, straightened, and drained roads. The Chief Engineer points out in his annual report, 1904–5, that "to get all the roads in the country into thoroughly good order, it will be necessary to carry out construction work, exclusive of flying or minor repairs, over at least 10 per cent. of the total mileage per annum, whereas two-thirds of our work for this year consists only of flying or minor repairs. To do construction over 10 per cent. of the roads would entail an expenditure of about £400,000 per annum, an amount which it is of course out of the question for the country to provide at present; but from the above figures it will be seen that the hope of getting all the roads in the country up to the standard, unless the expenditure is increased, is remote." There are no data available in the Transvaal on which to base an estimate of the life of a road. Many of the hills in the Transvaal are exceedingly steep, and present serious difficulties in the way of keeping in repair. Mulder's Drift, Krugersdorp; Letaba; Mashuti and Mamatola, between Pietersburg and Leydsdorp; Schoeman's Kloof, between Lydenburg and Machadodorp; and Pilgrim's Hill, between Lydenburg and the Pilgrim's Rest gold fields (portion of which has a 1 in 4½ gradient); Mziligazi Nek, and others, are very good samples of such hills. Thorough repairs are annually necessary to these places. On the other hand, many roads on the level High Veld have not yet been touched, and still require no attention, although as traffic increases, and fencing restricts the area of veld on the roadside, across which wagons and carts can turn out to avoid a bad place, attention will be required. The 65 items of road repairs, &c., contained in the blue book report, 1904–5, give some idea of the large amount of work performed by this branch of the Public Works. Reference to a few of the most important works will be of interest. On the Pretoria-Cantonments road a length of about 1¾ miles was thoroughly well macadamised, steam-rolled, culverted, and planted with trees, dangerous places being protected with stone walls. The total expenditure amounted to £9,078. On the Pretoria-Johannesburg road (*viâ* Irene) 2¼ miles were formed, drained, and culverted, 200 yards of metalling laid down at Birchleigh, over what was formerly an impassable vlei in wet weather, and the drifts at Six and Eight Mile Spruits repaired. This necessitated a further 200 yards of metalling. On the Krugersdorp-Rustenburg road, the deviation at Oliphant's Nek was completed, and a ¾ mile length metalled, steam-rolled, and completed. A 10 ft. culvert was built at the south end of the deviation. Elsewhere along the road 1⅛ miles of metalling was laid down, including ⅛ mile of causeway, and ½ mile of new road was formed. A deviation at Hartley's Poort yet

remained to be done, being rendered necessary by the fact that the Magalies River and the road run parallel for ¾ mile, and every year the former overflows, and does a great amount of damage. During 1904–5 a sum of £500 odd was spent in repairing the damage thus caused.

The following summary shows the total Roads expenditure for the year under review :—

	£
36⅞ miles of macadamised road, causeways, 1st-class deviations, etc.	46,380
77⅞ miles of road gravelled, formed, and straightened	30,982
109¾ miles of road formed and drained	26,230
400 miles of minor repairs.. ..	14,558
Salaries of officials not on staff ..	7,930
Salaries and transport allowances of officials not on staff	810
Transport hires, head office, &c...	5,328
Recruiting natives	196
Bryntirion Estate	7,178
Tar macadam opposite Law Courts and elsewhere in Johannesburg	408
624½ miles ..	£140,000

The approximate value of stores, plant, &e., in stoek, and available for service in 1905–6 was £5,000.

Bridges.—During the year 1904–5 thirteen large bridges, eonstructed to Government type, and eapable of earrying the heaviest elass of road traffie, were eompleted and opened, two footbridges of timber were finished and opened, and sixteen other permanent bridges were in hand on June 30th, 1905. Perhaps the most important of the eompleted structures, at all events the largest in point of size, is the bridge near Nelspruit, over the Croeodile River, on the Sabi-Nelspruit road. Nelspruit is the natural railway station for the Eastern Low Country. The old road erossed the river by three separate and distinet drifts, all bad even in winter, and usually impassable in the rainy season. The bridge eonsists of two 100 ft. spans and two of 60 ft. eaeh. Another important undertaking was the bridging of the Nels River, in the same loeality. The river here is very rapid, and a drift would have been not only dangerous to traffie but expensive to maintain. The bridge eonsists of three spans of 40 ft. The Elands River bridge at Maehadodorp, on the Lydenburg road, eonsists of one span of 100 ft. over a swiftly-flowing and very dangerous stream. The bridge over Blesbok Spruit on the Standerton-Ermelo road has one steel girder span of 80 ft., standard type. Two other bridges have been eompleted between the towns, one over Kafir Spruit with an 80 ft. span, and the other over Leeuw Spruit with a 40 ft. span. These bridges provide safe and permanent eommunieation in all weathers along this road. The Burgher's-street bridge at Standerton, also eonstrueted during the year, eonsists of three arehed spans at a skew of 58 deg. The spruit thus bridged is little more than a dry "donga" in the winter, but in the summer beeomes a raging torrent

A FARM NEAR VOLKSRUST.

which formerly cut off the town from the railway station, and was annually the scene of one or more casualties. An extra span was added to a culvert near Lydenburg, on the road to Pilgrim's Rest. Of the bridges under construction when this was being written, one of the most important is at Robinson's Drift, over a dangerous branch of the Hex River, on the Rustenburg-Krugersdorp road. The river is being crossed by one span of 100 ft., the cost of which, it is considered, will be met by an outlay of the amount annually spent on the upkeep of the drift. A bridge over the Aapies River at Wonderboom Poort (Pretoria district) has two spans of 80 ft. Another bridge nearing completion was one of urgent necessity, over the Blaauwbosch Kraal Spruit, between Machadodorp and Lydenburg. It has one span of 80 ft. A 30 ft. skew bridge, near Volksrust, was practically completed, and would be open for traffic, it was anticipated, in August, 1906. Three important bridges occur within a length of eight miles on the Pietersburg-Leydsdorp road, crossing the Ramadipa, Politsa, and Great Letaba Rivers, all of which are very dangerous. Amongst various minor repairs and renewals carried out, was the replacing of the superstructure of the North Bridge, Potchefstroom.

Transport.—This branch completed the first year of its existence on June 30th, 1905. The idea of the department was to bring all Government transport under one control, thus eliminating the probability of duplication and loss. Every Government department was by this means in a position to hire from the Transport Department, at a fixed tariff, the rate of which was so assessed as to cover working expenses and repairs. As a comparison between the amount of the hires and that of the working expenses showed a profit to the department, an amended tariff at reduced rates was issued. The original tariff rates averaged about 75 per cent. below the rates charged by private owners and livery-stable keepers. It will thus be seen how great a saving was secured to the Government by this system. The year's working proved eminently satisfactory, the vehicles having been put into and kept in thorough repair, and generally speaking the animals were in better condition than when the department was formed. The average number of animals of all kinds on hand throughout the year was 1,266, and the cost of feeding and general charges totalled £36,165.

A Year's Expenditure on Public Works.

The following is an abstract of expenditure on Public Works for the year ending June 30th, 1905:—

	£	s.	d.
Establishment	78,327	10	1
Travelling	8,875	11	1
Miscellaneous expenses	1,021	4	5
Maintenance of military graves	3,232	7	4
Repair works (over £200)	7,805	6	7
Maintenance and minor repairs (under £200)	45,744	7	9
Rent	50,336	9	9
Rates	21,200	11	2
Lighting	14,617	14	0
Insurances	4,721	7	3
Roads	140,814	12	8
Maintenance of bridges	592	3	8
Stores	6,393	4	3
Plant	1,314	1	9
Transport	55,771	14	9
New works of £1,000 and over	29,068	6	8
New works (over £200)	23,688	0	0
Minor alterations (under £200)	21,961	10	2
Furniture	27,732	11	1
New bridges	5,224	1	0
	£595,442	15	5
Loan services	413,279	8	3
	£1,008,722	3	8

Customs Department.

The Customs Department of the Transvaal Colony is a branch of the Colonial Treasurer's office, with the Colonial Treasurer as the executive head. The department (controlled by a Director of Customs, who is the permanent head) has administrative and revenue branches. The administrative branch is located at Pretoria, and the officials controlling it are the Director of Customs, the Secretary to the Customs department, with an accountant, an auditor, and a clerical staff. The revenue branch has Collectors and Deputy Collectors, Examining Officers, and a clerical staff. The Collectors or Deputy Collectors are distributed at the following stations:—Pretoria, Johannesburg, Delagoa Bay, Komati Poort, Barberton, Heidelberg, Middelburg, Potchefstroom, Klerksdorp, Krugersdorp, Germiston, Boksburg, Standerton, Volksrust, and Christiana. At places where no Customs officers are stationed the interests of the Revenue are watched by the officials of the Central South African Railways, and the South African Constabulary.

The annual report of the Director of Customs for the year ended 30th June, 1905, gave the following particulars:—

Exports.

The recorded value of exports from this Colony for the year ended the 30th June, 1905, was £20,670,720, as compared with £15,667,644 in 1904, an increase of £5,003,076. There has been a steady increase throughout the year ranging from £4,526,982 in the first quarter to £5,936,104 in the last quarter. Gold represents £18,420,644 of the total, and diamonds principally account for the balance. The increase under this item is nearly 300 per cent., the figures for the previous year being £402,980, as compared with £1,188,727 during the year under review. There are also very satisfactory increases in skins, hides, and horns, from £16,147 to £51,623; tobacco, from £31,622 to £60,923; and wool, from £43,927 to £85,128.

Imports.

The value of imports of merchandise during the year ended 30th June, 1905, amounted to £14,414,321, as compared with £14,878,044 in the previous year—a small decrease. There was, however, a steady improvement throughout the year, the quarter ending 30th June, 1905, showing a return of £3,966,370, as against £3,327,468 for the quarter ending 30th September, 1904. The recorded value of articles imported for the ordinary administration was £218,353, and for the Central South African Railways £617,721. These figures are not included in the total of £14,414,321. The recorded value of specie imported was £943,183, of which gold totalled £899,937, silver £42,895, and bronze £351.

The trade was distributed as follows :—

	£
From and *viâ* Natal	6,308,117
From and *viâ* Cape Colony (including Orange River Colony)	5,009,851
From and *viâ* Delagoa Bay	3,096,353

The United Kingdom enjoyed 45 per cent. of the trade (£6,496,654); other British possessions 25 per cent. (£3,553,966); other countries, 30 per cent. (£4,363,701).

The duty collected amounted to £1,669,339 (11·57 per cent. all round), and was borne by the various classes of goods as follows :—

Articles.	*Value.*	*Duties recovered therefrom.*	*Percentage of Duty to value.*
	£	£	
Foodstuffs—including sugar and jams	3,382,159	294,563	8·7
Stimulants—including tea, coffee, cocoa, chicory	199,959	45,836	22·9
Luxuries—such as confectionery, sweets, jewellery, tobacconists' ware, toys and sporting goods, clocks and watches, perfumery, toilet articles, musical instruments, playing cards, pictures, statuary	590,708	80,521	13·6
Intoxicants	403,784	549,756	136·1
Ale and beer	62,289	16,990	27·2
Spirits	254,551	490,671	192·7
Wines	86,944	42,095	48·4
Narcotics—tobacco, cigars, cigarettes	220,610	158,445	71·8
Textile fabrics,-blankets, haberdashery, and millinery, dress, including boots	2,445,057	205,256	8·4
Household articles—such as furniture, earthenware, crockery, glassware, brushware, cutlery, and other similar articles	415,681	31,773	7·6
Building and mining materials—such as iron and steel, timber, paints, wall paper, hardware, cement, window glass and piping	1,927,499	129,853	6·7
Machinery and implements—tramway material and electric cable	1,570,802	13,305	0·8
Apothecary ware and chemicals	512,438	10,241	2·0
Explosives	369,842	20,124	5·4
Vehicles	277,674	19,295	6·9
Other articles	2,098,108	110,371	5·2
TOTAL	£14,414,321	£1,669,339	

The cost of collection was 3·9 per cent.

From the amount of £1,669,339, the sum of £84,509 was subsequently refunded to the military on account of duties paid on canteen supplies and public stores, and to other parties of the Customs Union on account of goods exported, so that the nett Customs duties retained on goods entered for consumption during the year ended 30th June, 1905, amounted to £1,584,830, or 11 per cent. on the value. Penalties amounting to £5,716 12s. 3d. were imposed and recovered during the year. Rebates were granted on United Kingdom goods to the amount of £132,442, as compared with £120,353 in the previous year. During the year the preference was extended to Canadian goods, and the sum of £359 was rebated under this heading

The following table shows the quantity and value of goods exported from the Transvaal during the year ending 30th June, 1905 :—

Articles.	*Quantity.*	*Value.*
		£
Animals living—Horses and mules, No.	10,810	284,595
Sheep and goats, No.	14	59
Other kinds, No.	1,793	1,993
Apothecary ware and chemicals	—	14,408
Apparel and slops	—	26,711
Books and stationery—Books (printed)	—	4,961
Stationery	—	7,438
Boots and shoes	—	8,666
Canvas and duck	—	980
Coal, tons	300,608	123,143
Coffee—Raw, lbs.	25,949	362
Concentrates	—	13,740
Corn and grain—Kafircorn, lbs.	94,522	329
Mealies	341,388	994
Malt	87,573	509
Oathay and fodder	1,248,094	1,740
Oats	83,157	278
Diamonds	—	1,188,727
Electric cable	—	236
Electric fittings	—	2,305
Fruit, fresh	—	5,101
Furniture	—	11,970
Gold, ozs.	4,336,587	18,420,644
Groceries and oilman's stores	—	1,826
Haberdashery and millinery	—	33,036
Hardware	—	25,119
Instruments, musical	—	3,631
Iron and steel—rod, block, hoop, galvanized, fencing, and chains	—	6,132
Pipes	—	5,067
Jewellery	—	29,875
Leather—Saddlery	—	13,299
Manufactured and unmanufactured	—	5,967
Machinery	—	54,824
Meal and flour, lbs.	410,313	1,779
Milk, lbs.	47,787	661
Mohair, lbs.	182,618	6,654
Seeds, trees and plants	—	4,779
Skins, hides and horns	—	51,623
Tea, lbs.	12,899	619
Tobacco, lbs.	861,573	60,923
Cigars, No.	640,025	2,301
Cigarettes	9,644,800	9,725
Tobacconists' ware	—	1,788
Toys and sporting goods	—	1,624
Vehicles — Carts, carriages and wagons	—	23,183
Cycles and accessories	—	10,991
Vegetables, fresh	—	3,198
Wood, all sorts	—	6,805
Wool, lbs.	3,323,541	85,128
Works of Art—Pictures	—	7,464
Other goods	—	92,810
		£20,670,720

The following table shows the quantity and value of goods imported into the Transvaal for the year ending 30th June, 1905 :—

Articles.	*Quantity.*	*Value.*
		£
Acetic acid and vinegar, galls.	33,958	4,344
Agricultural implements	—	48,093
Ale, beer, and cider, gallons	441,167	62,289
Ammunition — Cartridges, No.	2,137,535	7,075
Cartridge cases, No.	85,200	172
Detonators	—	21,420
Gunpowder, lbs.	2,074	147
Percussion caps	—	63
Shot, lbs.	26,247	238
Animals living—Cattle, No.	10,686	131,615
Horses, No.	6,447	165,925
Mules, No.	1,426	19,515
Pigs, No.	7,027	10,925
Poultry, No.	399,292	62,521
Sheep and goats, No.	194,383	233,845
Other kinds, No.	5,665	4,980
Apothecary ware—Chemicals and toilet articles	—	344,560
Cyanide of potassium, lbs.	7,949,831	223,390
Quicksilver	—	11,796
Sulphuric acid	—	1,148
Acids, other kinds	—	692
Apparel and slops	—	633,475
Bags	—	46,830
Basketware	—	2,260
Beads, lbs.	135,165	4,082
Biscuits	—	58,665
Books and stationery—Books	—	70,856
Stationery	—	140,607
Boots and shoes	—	415,654
Brass and copper ware—Wire, not for electrical purposes	—	3,158
Rod and sheet	—	4,425
Brushware	—	20,968
Butter, lbs.	4,468,271	196,312
Butterine, margarine and ghee, lbs.	678,255	16,774
Candles, lbs.	12,236,238	176,138
Canvas and duck	—	11,084
Cards (playing)	—	3,777
Cement and lime—Cement, lbs.	83,409,015	53,147
Lime, lbs.	3,719,688	6,093
Cheese, lbs.	1,983,567	51,539
Chicory, lbs.	324,830	3,309
Chocolate and cocoa, lbs.	128,370	14,022
Clocks and watches	—	31,671
Coals, lbs.	101,572,546	22,239
Coke and patent fuel, lbs.	7,530,841	7,022
Coffee—Raw, lbs.	3,888,483	65,463
Roast and ground, lbs.	709,092	27,605
Confectionery and sweets, lbs.	2,176,843	70,285
Corks and bungs	—	5,012
Corn and grain—Barley, lbs.	927,579	5,017
Beans and peas, lbs.	4,421,947	18,592
Bran, lbs.	21,745,445	47,113
Chaff, lbs.	577,166	830
Dholl, lbs.	442,193	1,689
Flour and meal (wheaten), lbs.	89,169,764	432,306
Flour and meal (other kinds), lbs.	7,498,945	24,335
Kafircorn, lbs.	5,697,807	17,464
Lucerne and fodder	36,493,257	81,385
Malt	9,459,866	56,631
Manna, lbs.	4,237	37
Mealies, lbs.	88,645,632	194,324
Oathay, lbs.	43,129,970	94,166
Oats, lbs.	30,483,895	77,751
Rye, lbs.	611 576	2,081
Wheat, lbs.	2,428,731	11,152
Cotton manufacture	—	292,013
Dynamite and other explosives, lbs.	7,154,047	300,410
Earthenware and crockery	—	43,082
Eggs, dozens	2,166,936	116,283
Electric fittings	—	36,710
Fish—Fresh	—	59,452
Preserved and dried, lbs.	4,468,914	101,772
Fruit—Dried, lbs.	2,091,580	31,071
Fresh	—	144,045
Preserved, lbs.	857,656	15,643
Furniture and cabinetware—Carpets	—	25,781
Other kinds	—	300,891
Fuse	—	40,317
Glass bottles	—	22,581
Window	—	20,954
Other kinds	—	24,959
Glue	—	1,343
Grease and tallow	—	14,803
Groceries and oilman's stores	—	123,598
Gun barrels, No.	4,203	13 324
Haberdashery and millinery	—	869,671
Hardware	—	658,751
Hats and caps	—	807,550
Honey, lbs.	49,739	1,105
Hops	—	25,994

Articles.	*Quantity.*	*Value.*
		£
Instruments—Musical ..	—	63,842
Other kinds	—	13,846
Iron and steel—Chains ..	—	3,108
Fencing wire and poles..	—	32,374
Galvanized and corrugated	—	168,490
Pipes	—	150,454
Rod, block and hoop ..	—	120,153
Sheet	—	41,218
Jams and preserves, lbs. ..	2,158,409	36,234
Jewellery and plated ware..	—	176,288
Kafir picks and hoes ..	—	2,607
Lead—Bar and sheet ..	—	5,187
Pipes	—	1,575
Other kinds	—	1,930
Leather—Saddlery	—	41,207
Manufactured	—	29,142
Unmanufactured.. ..	—	23,136
Linen manufacture.. ..	—	10,659
Machinery—Agricultural ..	—	68,507
Electrical	—	103,026
Manufacturing	—	30,307
Mining	—	665,395
Other kinds	—	308,407
Matches, gross	229,378	30,097
Meats—Preserved, lbs ..	6,876,517	186,984
Fresh and game.. ..	62,473,722	794,229
Milk, preserved	11,417,670	178,432
Mineral waters	—	18,237
Oils, castor, gallons ..	6,839	1,277
Cocoanut, gallons ..	8,408	1,096
Lard, gallons	6,571	946
Lamp, mineral, gallons..	2,298,184	78,953
Linseed, gallons	80,350	7,037
Machine, gallons.. ..	614,600	31,885
Sweet, gallons	18,989	4,429
Other kinds, gallons ..	118,438	7,990
Paints	—	35,836
Paper—Printing	—	34,248
Wall	—	18,007
Other kinds	—	25,121
Photographic material ..	—	18,437
Pickles, sauces and condiments, lbs.	1,153,544	34,030
Resin	—	159
Revolvers and pistols, No.	1,179	2,135
Rice, lbs.	24,934,792	81,369
Rope—Wire..	—	42,014
Other kinds	—	14,591
Salt, lbs.	12,129,292	14,062
Seeds, trees and plants ..	—	43,272
Sheep dip	—	3,355
Soap—Household, lbs. ..	8,143,138	83,707
Perfumed and toilet, lbs...	167,565	7,863
Spirits—Liqueurs and bitters, gallons	8,528	4,883
Perfumed and scented, gallons	4,280	9,864
Oversea, gallons	597,873	245,276
South African, gallons ..	19,715	4,392
Stoneware—Grinding ..	—	210
Marble	—	1,818
Tombstones	—	1,500
Other kinds	—	667
Sugar, lbs.	40,248,143	368,348
Tar (all sorts)	—	13,657
Tea, lbs.	1,920,702	89,560
Tin and zinc—Rod and block	—	52,029
Other kinds	—	7,347
Tobacco—Cigars, No. ..	11,477,250	61,706
Cigarettes, No.	119,787,850	84,972
Snuff, lbs.	2,977	745
Manufactured, lbs. ..	520,590	39,367
Unmanufactured, lbs. ..	1,469,860	33,821
Tobacconists' ware.. ..	—	21,149
Tramway material	—	190,585
Toys and sporting goods ..	—	48,517
Turpentine, gallons ..	26,158	3,811
Varnish, gallons	18,951	4,616
Vegetables (fresh)—Onions, lbs.	4,957,401	20,573
Potatoes, lbs.	14,616,797	49,897
Other kinds	—	20,090
Vegetables (preserved) ..	2,193,818	24,401
Vehicles—Carts, carriages and wagons	—	161,981
Cycles and accessories ..	—	109,537
Wheelbarrows and other kinds	—	6,156
Wines—Oversea, gallons ..	84,022	32,856
South African, gallons ..	123,431	26,440
Sparkling and champagne, gallons	16,424	27,648
Wire—Electric cable and wire, and wire rope ..	—	96,890
Other kinds	—	380
Wood—Manufactured ..	—	169,173
Unmanufactured.. ..	—	364,435
Woollen manufacture ..	—	131,746
Works of Art—Pictures ..	—	17,998
Statuary	—	2,396
Goods not enumerated ..	—	18,625
		£14,414,321

During the period covered by the above tables there was an increase in the revenue derived from ale and beer, raw coffee, flour, and meal (wheaten), rice, fresh fruit, sugar, tea, candles, coals, confectionery, hops, spirits (oversea), tobacco (manufactured and unmanufactured), cigarettes, cattle, horses, mules, sheep and goats, poultry, boots and shoes, cotton manufacture, leather (unmanufactured), jewellery, cement, watches, mineral oils, wire rope, electric cable wire, iron pipes, fuse, tramway material, tin and zinc (rod, block, &c.), other kinds of tin and zinc, dynamite and other explosives, cyanide of potassium, quicksilver, detonators, chemicals and toilet articles. A decrease was noted in wheat, oathay, mealies, lucerne and fodder, kafireorn, oats, flour and meal (other than wheaten), coffee (roast and ground), biscuits, eggs, dried fruits, groceries and oilman's stores, jams and preserves, preserved meats, fresh meats, linseed oil, seeds, trees, and plants, vegetables, preserved vegetables, wines (oversea), sparkling wines, woods (manufactured and unmanufactured), leather manufacture, mining machinery and manufacturing machinery, carts, carriages, and wagons, cycles and accessories, hardware, glass, earthenware, furniture and cabinetware, agricultural implements, canvas and ducks, apparel and slops, musical instruments, and iron (rod, block, and hoop).

Dutch Schoolgirls (Hartebeestfontein, Klerksdorp district).

Department of Posts and Telegraphs.

PRIOR to the last Anglo-Boer war, the Post and Telegraph Department of the Transvaal employed a considerable number of British and Hollander officials, the telegraph operators being almost without exception aliens who had taken the oath of allegiance to the South African Republic. Some of these left the country on the outbreak of the war, some remained at their duties on the understanding that they should not be called upon at any time to take up arms; others, again, threw themselves whole-heartedly into the Boer cause, and rendered valuable service in the field, as also in the towns. Of the post and telegraph employés, many were retained in the service of the British military authorities after the occupation of the country; and the postal service was kept going, under great difficulties, by the military staffs which administered the affairs of the larger towns. This strictly technical work was entrusted to the Army Post Office Corps, a military organisation only requisitioned in time of war, the permanent nucleus of which is maintained in the Post Office (24th Middlesex) Volunteers, London. One of the oldest Volunteer corps whose privilege it is to be called out on active war service, it rendered valuable assistance in the Egyptian campaign, and some three hundred of these citizen soldiers served in South Africa from 1899 to 1902, struggling nobly, in the teeth of exceptional difficulties, with the volume of military and refugee postal matter which had accumulated in every direction from Capetown and Natal to Pretoria. Civil postal administration was established, side by side with the military postal work, about the middle of 1900, Major the Hon. W. L. Bagot being appointed Administrator of Civil Posts in July of that year. This department was naturally not permitted to develop very freely until the end of the war. When peace was concluded, twenty-nine post offices and thirty-one post agencies were open for the transaction of civil postal business, and 226 white officials were employed. Letter mails with Natal were resumed in September, and with the Cape Colony in October, 1900. The newspaper mail service was resumed in May, 1901, and the Imperial penny postage was adopted in December of that year. The extraordinarily rapid development which has characterised this branch of the public service is evidenced from the statistics given in the latest available report issued by the department (covering the period 30th June, 1904, to 1st July, 1905). It is shown that the number of postal offices open in the Transvaal in June, 1905, was 332; the staff employed, 1,276; the items of all classes of business transacted, 59,000,000. Of the staff engaged in duties at the commencement of 1906, 855 were employed in Johannesburg alone, 163 in Pretoria, and 98 along the Witwatersrand. Johannesburg absorbs over 50 per cent. of the entire postal operations in the Transvaal. One-third of the mail bags and boxes received at Capetown from Europe and elsewhere in 1905 were for delivery in the Transvaal. A house-to-house delivery was instituted by the Department on the 1st November, 1902. There are three deliveries daily. This service is now extremely reliable, and no fewer than 350,000 letters per month are delivered at their addresses. Prior to the war the number was less than 100,000 per month. Colonial and inter-colonial parcels, on which no duty is collectable, are also delivered by postmen, and 16 per cent. of the inward-oversea parcels are delivered by carts in Johannesburg. No fewer than 48,000 parcels were thus delivered in that town during the year ending June, 1905. On January 1st, 1906, an express delivery service between Johannesburg and Pretoria was inaugurated, and also a system of rural collection and delivery. During 1906 the house-to-house delivery system was established in Boksburg, Barberton, Klerksdorp, Krugersdorp, Potchefstroom, Pietersburg, Middelburg, Heidelberg, Standerton, and Volksrust. This relieves the post-restante of onerous work and congested offices, and the public of much tedious waiting. Good-conduct badges are awarded to postmen, with a monetary allowance attached, an arrangement adopted in July, 1904. It has had an excellent effect, the securing of such a badge denoting a degree of work and responsibility which makes it a distinctly honourable award. The year under review showed an increase in circulation within the Transvaal of letters and postcards 6 per cent., as compared with previous years; of newspapers and samples

THE GENERAL POST OFFICE, JOHANNESBURG.

28 per cent., of parcels 17 per cent., and of all items collectively 10 per cent. The mail train from Capetown, running over the new railway route between Vereeniging and Johannesburg, reaches the latter town five hours earlier than was the case before February, 1905. The hour of arrival at Johannesburg is 8 a.m., and at Pretoria 10.16 a.m. A "travelling post office" is attached to the train, and sorting is carried on throughout the journey, which obviates delay in delivery. The outward mail commenced running over the new line to Vereeniging on November 12th, 1904, starting one hour later than before, so that an extension of time of posting was possible. The time occupied on the journey from Capetown is 46 hours. Before the war, oversea parcels for the Transvaal were examined at Capetown. The introduction of a system of direct parcel mails to the Transvaal, and the improved train service, have resulted in a gain of five days for the delivery of parcels from oversea. On June 30th, 1905, there were in the Transvaal 938 miles of postal route covered by rail, 1,374 served by post-cart, and 2,496 by native runners, a large increase of the latter service becoming necessary, certain mail trains having ceased to run. The total mileage of rail-borne mail route at the commencement of 1906 was 1,204 miles. Of private letter delivery boxes attached to the General Post Office, there were at the end of June, 1905, no fewer than 7,000 in Johannesburg, and 1,450 in Pretoria, while in other offices the number was 6,629. There were also 187 private post bags in use, and 99 pillar and wall post-boxes, as well as those (332) in post offices and agencies. The building of a new General Post Office at Pretoria and at Johannesburg, and a stores department storing house near the railway premises at Johannesburg, are an urgent necessity. An early post clearance between 6 a.m. and 7 a.m. was instituted experimentally in Johannesburg, and this arrangement has become permanent, being of the greater service to business men on the Rand and in Pretoria. The daily average of letters collected by this means is over 1,400. Three burglarious attempts were made during the year under review to enter post offices (at Pietersburg, Belfast, and Doornfontein). In the first two instances small losses ensued, and the criminals were captured; at Doornfontein (Johannesburg) the safe was blown open, but the thieves were disturbed, and secured nothing. The mail cart from Klerksdorp to Fourteen Streams was waylaid on one occasion, when seven miles from Christiana. By cutting the fastenings at the back of the cart, seven bags of mails were abstracted. Most of the articles were recovered, but the thieves were not captured. An accident occurred by which the post cart from Wakkerstroom to Piet Retief was upset while crossing the Assegai River, the mules being drowned and the mail-bags immersed in water for five hours. So few accidents and losses, in a service extending over so large a tract of country, a great part of which is unserved by railway routes or closely connected by the establishment of important towns, is solid proof of its security and efficiency. This received testimony of a most gratifying nature in the transmission of the "Cullinan" diamond—probably the most valuable article in itself ever consigned to the post—which was sent from the Transvaal to London in a registered packet. The postage according to weight, and the registration fee of 4d., was the extent of the cost of the transmission of this valuable stone, and the sum of £2 only would have been recoverable had loss ensued. No higher token of confidence in the public service could have been given than that this should be regarded as the safest as well as the cheapest medium for the dispatch of an article worth in itself a fortune. In 1905, the number of articles dealt with by the Returned Letter Office in the Transvaal was 637,989, or 13·2 of the total number of all mail articles handled; as against 639,600, or 13·3 of the total number, in 1904. The percentage which proved undeliverable and unreturnable was 31, as against 34 for the previous year. A large proportion were in transmission from and to natives. Coin and other articles dealt with by this branch amounted in value to £10,381, as against £12,586 and £18,588 respectively in the two preceding years.

The Postal Department has been able in many instances to employ men retrenched from other Government departments, but has not at any time been under the necessity of reducing its own staff. Telegraph messengers are paid by results, in proportion to the number of messages safely and promptly delivered. This has induced a much healthier spirit among the boys, loitering being rare, and the cost of delivery reduced accordingly. The revenue of the Post and Telegraph Department for the financial year under review was as follows:—

Main Hall of the General Post Office, Johannesburg.

Total revenue for 1904-5—£405,118 15s. 7d.
" " 1903-4—£358,313 3s. 6d.

A surplus was shown for the year of £38,784 9s. 6d. (this being the first time that the Department in the Transvaal had been known to produce a surplus in its working). Of the total revenue, £250,907 6s. was derived from postal business, and

£154,211 9s. 7d. from telegraphs and telephones. The figures for the preceding year were :—

Postal business	£220,152 5s. 2d.
Telegraphs and telephones	£138,160 18s. 6d.

The Department's expenditure was :—

In 1904-5..	£366,334 6s. 1d.
In 1903-4..	£385,340 4s. 7½d.

The increase in the revenue and decrease in the expenditure, in 1904–5, as against the previous year, was therefore as follows :—

Increase in revenue ..	£46,805 11s. 11d.
Increase in expenditure ..	£19,005 18s. 6½d.

Salaries, wages, and allowances represented 78·3 per cent. of the expenditure, and totalled £287,204, of which £8,593 was payment for overtime and for duty on Sundays and public holidays. The allowances to married officers in receipt of not more than £440 per year whose families resided with them amounted to £6,970, and "allowances for duty in unhealthy districts" were £267, as against £336 in 1903–4. The Postal Department of the Transvaal rendered services to other departments gratis, in respect of postage, telegraphic communications, telephone work, and private boxes and bags, to the value of £38,679 6s. 1d. In the preceding year the value of such services rendered was £63,286 2s. 9d. The Department was also responsible for the collection of £39,704 14s. in respect of Customs dues on dutiable packets. Of revenue stamps sold at post offices, £86,202 14s., and of dog and game licences issued £1,550 19s., were amounts collected. The Post Office also undertakes collection of farm taxes, squatters' rents, and Crown rents in various districts. All the above amounts and collections are paid into the Treasury of the Transvaal under the heading "Revenue collected for other Government departments." The expenditure from capital account during 1904–5 was £32,623 11s. 7d., of which £27,529 4s. was obtained from Treasury balances. The total capital expenditure to June, 1905, was £310,758 14s. 7d., and of this amount telegraphic construction and re-construction absorbed £132,519 5s. 7d., and telephone construction £99,085 3s. 8d.—the balance in hand consisting chiefly of material.

The Transvaal is included in the Universal Postal Union.

Money Orders and Postal Orders.

The amount of money order business transacted in 1904–5 by the Post and Telegraph Department of the Transvaal was as follows :—

Issued.		Paid.	
Number.	Amount value.	Number.	Amount value.
309,020	£1,357,569 13s. 2d.	93,367	£405,226 9s. 4d.
Increase on amount paid in 1903-4			22,294 7s. 7d.
Decrease on amount issued in 1903-4			40,818 10s. 5d.

Sorting Department, General Post Office.

The amount transmitted by money orders to the United Kingdom was fifteen times the amount received from that country; the amounts sent to the Cape Colony and Natal during the period under review were 3½ times, to Australia 23 times, and to India 105 times the amounts received respectively from those countries. The number of offices open for the transaction of money order business at the end of June, 1905, was 105. The gross amount of money order commission received was £20,969 11s. 6d., of which £5,327 18s. 8d. was paid to the revenue of other countries. Commission to the value of £774 17s. 6d. was received from other countries in the same period. The maximum amount for which a money order may be issued is £40. The rates of commission for the Transvaal are 6d. on every £4 or fraction thereof; for other South African Colonies 9d. for every £4 or fraction thereof; for oversea 1s. for every £4 or fraction thereof. The value of void orders paid to the revenue was £799 5s. 8d. during the year under review. The Christmas mail of 1904 despatched to England contained 14,031 money orders, of a total value of £45,966 0s. 7d. The mail of the preceding year despatched at Christmas time carried a total value of £22,748 10s. 2d. in money orders. In 1905 the amount was £15,512. British money orders issued in the Transvaal for payment in the United Kingdom, and those issued in the United Kingdom for payment in the Transvaal, are a new feature of the Transvaal money order business; and the same system applies to postal orders. The money order service has now been extended by convention to apply to Portuguese East Africa and Hong-Kong, the Transvaal acting as intermediary between Portuguese East Africa and certain other countries, including the United Kingdom. Orders on Japan and China now proceed *viâ* Hong-Kong instead of by way of London. The service has been extended, *viâ* the United Kingdom, to the British Protectorate of Northern Nigeria, to the British Protectorate of Somaliland, and to Russia, the United States of Mexico and Peru. Conventions for direct exchange of money orders were in contemplation at the time of writing between the Transvaal and France, Italy, Holland, Austria-Hungary, and Switzerland.

Of postal orders, 130,641 were issued and 128,748 paid during the year ended June 30th, 1905. The value totalled £70,741 5s., and those paid were of a value of £69,847 6s. 6d. Of the total, 81,692 were paid in the Transvaal, and

46,786 in other parts of Africa. The Department also paid 15,820 postal orders issued in other South African administrations, to the value of £7,730 17s. Up to June, 1905, postal orders could be purchased at 102 postal agencies other than post offices, an increase of 26 during the year. The service has been extended to Mozambique, and postal orders issued in the Cape Colony, Natal, the Orange River Colony, Rhodesia, and Mozambique can be cashed at par in the Transvaal, but only the Orange River Colony reciprocates this convenience. The highest amount for which a postal order can be obtained is generally 20s. So many demands for postal orders for 21s. are made, however, that issues of orders for that amount have been also arranged for.

The following figures show the amount of matter dealt with in the Christmas mail, 1905:—

Articles of Mail Matter.

	Bags.	Letters.	Other Articles.	Parcels.
Oversea—				
Despatched	781	194,310	63,494	1,307
Received	1,451	146,375	97,463	4,392
Other South African Colonies—				
Despatched	504	103,198	25,195	1,228
Received	483	99,568	39,477	1,586
Inland correspondence received at Transvaal offices for local delivery	1,640	248,354	124,566	2,146
	4,859	791,805	350,195	10,659

Total number of mail bags dealt with	4,859
Total number of articles „ „	1,152,659
Number of oversea money orders despatched	11,771
Value „ „ „ „	£45,511

The following telegraphic messages were dealt with on Christmas Eve:—

At Johannesburg	9,126
At Pretoria	2,926

Savings Bank Department.

The Savings Bank Department of the postal service, which was established in 1893, has been very largely developed since the war. Deposits to the amount of £1,272,087 10s. 7d. were made during the year referred to, while withdrawals amounted to £1,129,366 7s. 4d. The number of accounts open in June, 1905, was 40,844, an increase of 5,785 on the previous year. The number of offices transacting business for this branch was 105, but nearly 65 per cent. of the business done is along the Witwatersrand. For the first time since the introduction of the savings bank the amount deposited has exceeded £1,000,000. Every facility is afforded to heirs of deceased depositors, and an arrangement is in process of establishment, in conjunction with mine managers, which enable the Chinese coolies to use the Post Office Savings Bank with a minimum of trouble and loss of time. The revenue of this branch of the postal service for 12 months to the end of June, 1905, was £61,674 19s. 9d. Working expenses amounted to £11,085, 9s. 3d., and the net profit to £16,362 12s.

Instrument Room, Telegraph Department, G.P.O.

Telegraphs and Telephones.

The number of telegraph offices open for the transaction of public business in June, 1905, was 113. In March, 1906, the number of employés of the Telegraph Department was 327. In some small centres, the railway telegraph offices transact the necessary business, although these offices cannot undertake to deliver telegrams beyond a radius of half a mile from respective offices. The number of telegraphic messages dealt with during the financial year 1904–5 was 4,281,300, which showed a decrease of 108,630 in comparison with the preceding year. Johannesburg messages gave an increase of 114,529. This is in a great measure due to the facilities for direct communication which have been established between the Johannesburg Stock Exchange and the telegraph offices at Capetown, Kimberley, Pretoria, Durban, Pietermaritzburg, and Port Elizabeth. The decrease in telegraphic communication throughout the rest of the Transvaal may be attributed in part to depression in trade, but also largely to the withdrawal of certain Government officials from outlying districts. Direct communication between the Johannesburg Stock Exchange and the principal South African towns in other colonies was established on November 21st, 1904. This obviated much congestion in the central telegraph office, and ensured dispatch in the treatment of Stock Exchange matter which could not otherwise be reckoned upon. The charge for inland telegrams is now fixed at 1d. per word with a minimum of 1s. This gives a uniformity in rate throughout the South African Colonies. The length of routes covered by the telegraph system of the Transvaal up to June, 1905, was over 2,446 miles, the mileage of wire being 9,469 miles 294 yards. The revenue derived from public business transacted by this department of the service showed an increase of £4,150 1s. 0½d. for the year under review, as compared with the preceding year. Work done for other Government departments had correspondingly decreased. The total value of work

undertaken for the Government during 1904–5 was £19,177 1s. 11d., of which part—to the value of £16,019 9s.—was unpaid, while £3,157 12s. 11d. was disbursed by the army and departments under the control of the Inter-Colonial Council. Telegraphic addresses are registered, a fee being charged. Deposit accounts are sanctioned for those making large use of the telegraphic service. These accounts are settled monthly, a charge of 5 per cent. on the actual turnover being made, which practically covers cost of the necessary extra clerical labour. The system works with the happiest results, and obviates the need of entrusting messengers with cash payments. Very heavy pressure of business is borne by this department at Christmas time, and also on two other occasions during the year under review the resources of the telegraph staff were taxed to the utmost. December 16th, 1904, date of the interment of ex-President Kruger, was an exceptionally heavy day, as was also April 25th, 1905, the date upon which the new Transvaal Constitution was published at Pretoria. On both occasions the staff of the Telegraph Department proved equal to the demands made upon it by the public. The cable service from the Transvaal during 1904–5 showed that during the period 10,890 messages were received, 10,290 despatched, and 15,132 transmitted. The arrangement between the Eastern Telegraph (Cable) Company and the South African Administration is that, should the takings of the Company not reach an average of £300,000 in three years, the Company is subsidised by the Administrations. Payment of the subsidy has not yet been needed. The value of the outward cable traffic from the Transvaal for the financial year ending 30th June, 1905, was £101,259 7s. 10½d. The inward traffic for the period is estimated at approximately the same amount.

The telephone installation taken over by the British Administration after the war was old-fashioned and inadequate, the accommodation for the operators, in particular, being in the last degree unsuited. Under the present administration the old Berthon installations have been replaced by an up-to-date system, of which the switchboard is described as "full lamp signal semi-central energy double-lamp supervisory multiple." Subscribers are provided with an apparatus of the most efficient pattern. The plant now in use in Johannesburg, though at the time of writing only equipped for 2,100 subscribers, has an ultimate capacity of 3,600. The whole telephone service has been modernised and equipped, and the exchanges at Pretoria, Boksburg, Germiston, and Krugersdorp have been equally improved. Underground cables in the place of overhead wires (liable to accidents and interruptions) are being placed as rapidly as the resources of the department will permit. The laying of the cables, jointing and distribution, is all performed by the departmental staff, and all cables are centred in the new Exchange buildings, which have been erected on Government property in Von Brandis Square. Two-thirds of this building, which is of solid and handsome design, had been completed at the commencement of 1906, to give accommodation for the offices of the engineering staff and supply the needs of 4,000 subscribers. The total mileage of wires in June, 1905, was 9,008. There were sixteen call offices in direct communication with the Johannesburg Exchange—four at Pretoria, and one each at Germiston, Boksburg, and Krugersdorp. Wherever available, private telephone installations on the Witwatersrand mines will be absorbed and worked on a uniform system. The annual subscription for unlimited use of the telephone system is £20. Smaller sums, however, on a system of deposit accounts, are admitted for subscribers whose need for the system would not make it worth their while to subscribe the whole amount. Private branch exchanges have been installed for the use of some Government departments and several of the mines. The extension of the telephone work to outlying towns in the Transvaal is anticipated. The day work of the exchange is performed almost entirely by female operators, men being principally employed on night duty. Women were first employed in the Post and Telegraph Department on the 1st August, 1902. The introduction of female clerks in Government offices in the Transvaal has been one of the innovations most appreciated since the advent of the British Administration. In the postal departments it has been unusually successful, and a system of instruction has been introduced, by which young lads and girls are trained to the work of the various branches of the service. Telegraph schools have been inaugurated in Johannesburg and Pretoria, where technical and operating tuition are given. The chief advantage of this system is that it provides a constant supply of operators and clerks from the population of the country, it obviates the necessity of importing new employés, and it affords parents an honourable means of providing a career for their children. In June, 1905, there were 116 students, male and female, receiving tuition. Of these 82 were telegraphic students. Where no schools exist, learners may attend the Department's offices to be instructed.

The following was the number and classification of the administrative staff of the General Post Office at the commencement of 1906:—The Postmaster-General; the Secretary to the Post and Telegraph Department; Principal Clerk; Telegraph Traffic Manager; Chief Accountant; Assistant Accountant; Superintendent of Mails; Chief Engineer, Engineer, and two Assistant Engineers; District Engineer; Controller of Stores, and Assistant Controller of Stores; seven senior clerks; Inspector of Post Offices; twenty-five first-class clerks, sixty-three second-class clerks, two junior clerks, and one sorter. In the departments employing women there were five first-class clerks, eleven second-class clerks, and eleven junior clerks, under a Superintendent.

The "Cape Cart," the universal vehicle of the Colonist.

Transvaal Municipalities.

MUNICIPALITIES OF THE TRANSVAAL COLONY, SHOWING APPROXIMATE AREA AND RATEABLE VALUE, AND POPULATION.

CONSTITUTED BY ORDINANCE IN 1903.

Municipality.	Approximate Area.	Rateable value.	Population.
		£	
Barberton	2,000 morgen	Not assessed	2,808
Boksburg	38·12 sq. miles	955,558	27,000
Germiston	25 sq. miles	2,451,609	30,127
Heidelberg	3,013 morgen	620,800	3,219
Johannesburg	81¾ sq. miles	43,878,071	155,642
Krugersdorp	90 sq. miles	1,276,000	19,483
Klerksdorp	11,227 morgen	330,948	—
Middelburg	13,000 morgen	53,550	7,200
Pietersburg	16,000 morgen	595,655	3,277
Potchefstroom	1,000 morgen	977 897	14,237
Pretoria	7 sq. miles	10,300,000	36,700
Roodepoort-Maraisburg	44·46 sq. miles	731,721	16,362
Standerton	3,000 morgen	533,000	6,000

CONSTITUTED BY ORDINANCE IN 1905.

Municipality.	Approximate Area.	Rateable value.	Population.
		£	
Amersfoort	3,250 morgen	Not assessed	221
Amsterdam	—	—	250
Belfast	3,750 morgen	—	—
Bethal	3,000 morgen	—	600
Carolina	2,249 morgen	97,985	—
Christiana	6,260 morgen	80,000	2,190
Ermelo	3,012 morgen	211,180	1,451
Lichtenburg	10,500 morgen	Not assessed	1,800
Lydenburg	8,358 morgen	173,237	1,523
Machadodorp	267 morgen	—	—
Nylstroom	4 sq. miles	56,425	579
Piet Retief	7,527 morgen	40,000	1,928
Potgietersrust	700 acres	—	380
Rustenburg	800 morgen	—	1,250
Schweitzer-Reneke	17,000 acres	—	500
Springs	28,039 sq. miles	175,578	6,745
Ventersdorp	8,000 morgen	79,000	611
Vereeniging	—	—	—
Volksrust	6,621 acres	163,736	2,382
Wakkerstroom	9,948 morgen	89,823	—
Wolmaransstad	6,700 morgen	30,000	—
Zeerust	3,215 morgen	—	2,537

The administrative divisions of the Transvaal Colony are as follows:—Barberton, Bethal, Bloemhof, Carolina, Ermelo, Heidelberg, Lichtenburg, Lydenburg, Marico, Middelburg, Pretoria, Piet Retief, Potchefstroom, Rustenburg, Standerton, Swaziland, Waterberg, Wakkerstroom, Wolmaransstad, and Zoutpansberg.

Population Statistics.

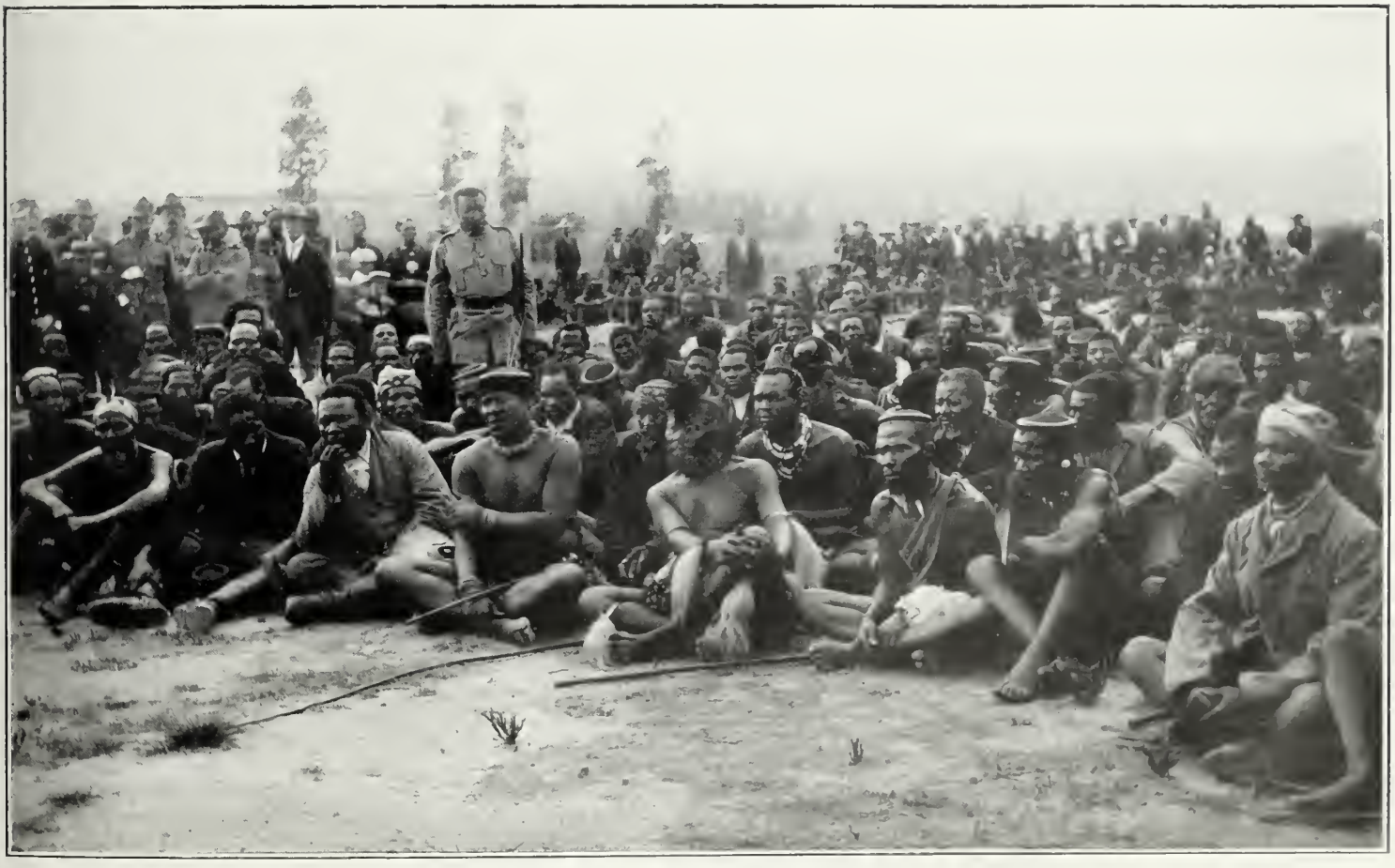
THE limits of the Transvaal Colony extend from 28.40 to 22 S. degrees of latitude, and between 24.40 and 32.10 E. in longitude. The total population of the Colony, including the dependency of Swaziland, according to the census returns of 1904, numbers 1,355,345, of which 298,156 are Europeans, 1,021,577 aboriginal natives, and 35,612 of other coloured races. Of this total, European women number 119,604, aboriginal natives 439,312, and other coloured races 7,065. The term "coloured" applies to Asiatics, coloured persons from other parts of the world, and the "Cape" or half-caste classes. Chinese labourers on the Witwatersrand mines are not included under that heading. The statistics for the various divisions of the Colony are given on the next page.

THE CENSUS.—The first census taken in the Transvaal was in 1890, when Europeans only were counted. In the compilation of the census of 1904 there were employed 2,146 enumerators and interpreters, of whom 468 were members of the South African Constabulary and regular forces. A novel method was adopted in counting the kraal natives, who were numbered off by means of beads, different colours and

Division (and area).	European. Town.	European. District.	Native. Town.	Native. District.	Coloured. Town.	Coloured. District.	Total.
Barberton (4,463 sq. m.)	1,368	1,274	1,187	23,340	233	116	27,727
	Military 161		48				
Ermelo (4,915 sq. m.) ..	1,275	6,251	1,057	25,362	52	728	34,725
Heidelberg (2,410 sq. m.)	2,283	8,567	1,520	14,896	317	318	27,901
Krugersdorp*		5,686		6,230		202	12,118
Lichtenburg (4,487 sq. m.)	1,181	5,105	102	9,638	34	16	16,076
Lydenburg (10,468 sq. m.)	1,858	4,969	2,022	95,508	66	67	104,490
Marico (3,626 sq. m.) ..	975	5,764	912	18,466	55	176	26,348
Middelburg (4,977 sq. m.)	2,395	8,254	1,204	35,567	83	165	
	Military 2,242		672		24		50,607
Potchefstroom (4,805 sq. m.)	8,660	15,506	5,067	18,525	510	598	
	Military 1,227		1,187		20		51,300
Pretoria (town) .. .	21,161		12,295		3,244		36,700
Pretoria (6,525 sq. m.)	1,369	17,617	439	60,319	11	357	
	Military 3,404		1,657		516		85,689
Rustenburg (9,511 sq. m.)	781	10,711	982	39,627	52	21	52,174
Standerton (3,226 sq. m.)	2,235	8,957	1,775	12,698	295	218	
	Military 1,108		548		16		27,850
Wakkerstroom (3,801 sq. m.)	2,486	6,100	2,333	42,411	214	175	53,719
Waterberg (15,503 sq. m.)	709	3,648	335	62,226	25	70	67,013
Witwatersrand (1,653 sq. m.)	92,410	23,089	66,855	62,368	11,753	2,598	260,388
	Military 1,171		138		9		
Wolmaransstad * (5,172 sq. m.)	2,328	6,766	410	6,105	65	199	15,873
Zoutpansberg (25,654 sq. m.)	2,160	5,643	1,841	307,508	205	61	317,418
Swaziland (6,536 sq. m.)	898		84,531		55		85,484
(*Travellers by C. S. A. Railways*)	473		117		10		600

* Census districts only. Krugersdorp town returns are included in "Witwatersrand." The district of Bloemhof and Piet Retief are included with the adjoining districts for enumeration purposes.

sizes signifying male, female, married, single, adult, or infant. The beads were given to the respective headmen, to string on cords according to the number and condition of their people. The census showed the number of persons in every household throughout the country on the night of April 17th, 1904. The proportion of coloured and native persons in the Transvaal Colony is 3,238 for every 1,000 of European descent. Among Europeans there are 66 females to each 100 males, and among the aboriginal races 87 females to every 100 males, excepting in Swaziland, where females predominate by 130 to 100. A large number of natives are recruited from that part of the country for labour on the Rand mines. These are therefore included in the "Witwatersrand" returns. The Witwatersrand has the densest population, a little below 165 persons to the square mile. Pretoria follows with from 18 to 19 inhabitants to the square mile. The density of the population of the whole Colony is 11·4 persons to the square mile (56 acres per person).



MEETING BETWEEN LORD SELBORNE AND NATIVE "INDUNAS," EASTERN TRANSVAAL.

Finance and Banking Institutions.

FINANCIALLY and politically that portion of territory north of the Vaal River formerly known as the South African Republic has had a chequered career. The burghers of the Republic were intolerant of taxation. Ready and willing to render personal service by taking up arms in the common cause of the moment, they deemed their duty to the State amply fulfilled when the immediate danger was overcome, and resented the imposition of a monetary contribution for the upkeep of the administration. Hence the exchequer difficulties which culminated in 1876, when President Burgers, addressing the Volksraad, said "he would rather have cut off his right hand than put it to a bill which had that day been placed before him for signature, for he knew that when it became due there would not be one shilling in the Treasury to meet it." About this period the Government credit had fallen so low that £1 notes were only worth a shilling. It was this hopeless condition of the finances of the country that overcame the natural reluctance of the people to the surrender of their independence in 1877. Resultant security from native molestation, and the internal quiet of the newly-annexed territory, rapidly established the Transvaal finances on a sounder basis, a desirable condition maintained up to the time of the retrocession in 1881. A few years later all fears of future financial embarrassment were dispelled by the discovery of gold and the development of the Witwatersrand fields, which opened up a wide vista of national wealth. The financial history of the Republic ends with the declaration of war, as the springs of taxation dried up with the temporary disappearance of the uitlander from Johannesburg. The mines were worked on account of the Government for the first few months during hostilities, but were subsequently abandoned. The following statement extracted from Sir Percy Fitzpatrick's "The Transvaal from Within" is interesting as bearing on the finances of the Republic:—

Revenue and Expenditure of the South African Republic from 1871 to 1899.

				Revenue.	Expenditure.	
August	1, 1871 to	July	31, 1872 ..	£40,988	£35,714	
„	1, 1872 „	January	31, 1873 ..	43,239	41,813	
February	1, 1873 „	„	31, 1874 ..	49,318	45,482	(Gold discovered in Lydenburg.)
„	1, 1874 „	„	31, 1875 ..	58,553	61,785	
„	1, 1875 „	„	31, 1876 ..	64,582	69,394	
„	1, 1876 „	„	31, 1877 ..	62,762	64,505	
„	1, 1877 „	April	12, 1877 ..	25,752	17,235	
April	12, 1877 „	December	31, 1877 ..	54,127	70,003	(British Government.)
January	1, 1878 „	December	31, 1878 ..	76,774	89,063	
„	1, 1879 „	„	31, 1879 ..	93,409	177,596	
„	1, 1880 „	„	31, 1880 ..	174,069	144,943	
„	1, 1881 „	October	14, 1881 ..	25,326	186,707	
August	8, 1881 „	December	31, 1881 ..	37,908	33,442	(Boer Government.)
January	1, 1882 „	„	31, 1882 ..	177,407	114,476	
„	1, 1883 „	„	31, 1883 ..	143,324	184,344	
„	1, 1884 „	March	31, 1884 ..	44,557	18,922	
April	1, 1884 „	„	31, 1885 ..	161,596	186,820	
„	1, 1885 „	„	31, 1886 ..	177,877	162,709	(Sheba Mine floated.)
„	1, 1886 „	December	31, 1886 ..	196,236	154,636	(Rand proclaimed Sept., 1885.)
January	1, 1887 „	„	31, 1887 ..	637,749	594,834	(Shares quoted Johannesburg Stock Exchange.)
„	1, 1888 „	„	31, 1888 ..	884,440	720,492	
„	1, 1889 „	„	31, 1889 ..	1,577,445	1,201,135	
„	1, 1890 „	„	31, 1890 ..	1,229,061	1,386,461	
„	1, 1891 „	„	31, 1891 ..	967,192	1,350,074	
„	1, 1892 „	„	31, 1892 ..	1,255,830	1,187,766	(Railway reached Johannesburg September 15th.)
„	1, 1893 „	„	31, 1893 ..	1,702,685	1,302,054	
„	1, 1894 „	„	31, 1894 ..	2,247,728	1,734,728	
„	1, 1895 „	„	31, 1895 ..	2,923,648	1,948,249	
„	1, 1896 „	„	31, 1896 ..	3,912,095	3,732,492	
„	1, 1897 „	„	31, 1897 ..	3,956,402	3,896,816	
„	1, 1898 „	„	31, 1898 ..	3,329,958	3,476,844	
„	1, 1899 „	„	31, 1899 ..	4,087,852	3,951,234	(Budget.)

The figures for the period 1871 to the end of 1887 are extracted from "Jeppe's Transvaal Almanac" for 1889. They represent the ordinary revenue and expenditure arrived at after the deduction of the items "Special Receipts," "Special Deposits," "Deposits Withdrawn," "Advances Refunded," "Advances Made," and "Fixed Deposits" from the totals given in the official Government returns. The figures for the years 1888 and 1899 are those of the published Government returns after the deduction of fixed deposits from 1888 to 1893 inclusive, the sale and purchase of explosives from 1895 to 1898 inclusive, the owner's share of claim licences from 1895 to 1898 inclusive, and Delagoa Bay Customs dues paid to the Netherlands Railway for 1898 and 1899.

When the Crown resumed occupancy of the country a sum of three millions sterling was allocated for the purpose of repatriating and re-settling the former inhabitants on their holdings. Clause 10 of the agreement of the terms of surrender stated: A Commission on which the local inhabitants will be represented will be appointed in each district of the Transvaal and the Orange River Colony under the presidency of a magistrate or other official for the purpose of assisting the restoration of the people to their homes and supplying these who owing to war losses are unable to provide themselves with food, shelter, and the necessary amount of seed, stock, implements, etc., indispensable to the resumption of their normal occupations. The next clause provided that the Government would place at the disposal of these Commissions a sum of three millions, and also stipulated that all notes issued under Law 1 of the South African Republic and all receipts given for war purposes by officers of the late republics should be regarded as evidence of war losses if

certified to by a Commission to be appointed by the Government for that purpose. In addition, His Majesty's Government asserted its willingness to make advances on loan free of interest for two years, and afterwards repayable over a period of years with three per cent. interest. It will be seen that the situation created a gigantic financial task. To establish schools and provide full equipment of teachers presented no inconsiderable undertaxing. (The estimated cost of the Education Department for 1905-6 was over £358,000, or in round numbers about £1 4s. per head of the white population.) The provision of ways of communication was a pressing problem, fertile lands inaccessible to markets required to be opened up, scientific agriculture needed to be fostered, diseases in stock combated, the rainfall brought to better account by forest conservation and irrigation, an adequate force was needed to police the country, the judiciary was strengthened, and native administration was expanded. Revenue necessary for these purposes was so secured as to ensure that the burden of taxation in the future should embrace all the taxable resources of the State without pressing unduly on the individual. As a source of revenue the railways have been made to bear a heavy burden which in addition to Customs impost has indirectly taxed all consumption The mines have in the payment of a 10 per cent. profit tax and royalties played a generous part in their contribution to the national exchequer. One item in the mining receipts is interesting. The discovery of the Premier diamond mine within thirty miles of the town of Pretoria opened up a rich prospect of extraordinary taxation. When the magnitude of its resources became assured the Legislative Council passed an Ordinance by which the State participated in the profits to the amount of 60 per cent. without liability. This item of special legislation is noteworthy as being a unique enactment on the statute books of the British Empire.

ABSTRACT OF ESTIMATED GROSS EXPENDITURE FOR THE YEAR 1905-6.

Reserved Civil List		£48,000
Contribution to Inter-Colonial Council		830,000
Ordinary expenditure		3,749,944
Extraordinary expenditure		347,442
		4,975,386
Deduct	£ 48,000	
	830,000	
Appropriations in aid	180,793	
		1,058,793
		£3,916,593
Nett expenditure to be voted :—		
Ordinary	3,569,151	
Extraordinary ..	347,442	
	£3,916,593	

NOTE.—The Reserved Civil List, under Letters Patent dated 31st March, 1905 (since cancelled), provided for the constitution of a Legislative Assembly in the Colony of the Transvaal.

The Lieutenant-Governor to receive		£6,000
Chief Justice	£4,000	
Six Puisne Judges, each ..	3,000	22,000
Attorney-General		3,500
Colonial Secretary		3,000
Commissioner for Native Affairs ..		3,000
Colonial Treasurer		2,000
Commissioner for Mines		2,000
Commissioner for Lands		2,500
Reserved		4,000
TOTAL ..		£48,000

The State is put to considerable expense in the up-keep of hospitals. These institutions are partly maintained by local and voluntary contributions, but a large grant in aid is necessary to keep them in a state of efficiency. The estimated Government expenditure for public health for 1905-6 was in round figures £112,000, or about 7s. 6d. per head of the white population.) The disbursements on all services of the Colony are as follows :—

Contributions from the Revenues of the Colony to the Inter-Colonial Council under the Provisions of the Inter-Colonial Council South African Order in Council dated May 20th, 1903, £830,000.

ORDINARY EXPENDITURE.

Total Estimated Expenditure for the year 1905–6, including Reserved Civil List.

H.E. The Lieutenant-Governor ..	£12,660
Executive and Legislative Councils ..	35,391
Attorney-General	28,625
Sheriff	7,670
Commissioner of Patents	4,690
Registrar of Deeds	11,745
Master of the Supreme Court ..	10,910
Superior Courts	55,300
Magistrates	129,402
Lunacy	27,084
Town Police	351,677
Prisons	207,717
Colonial Secretary–1	70,000
Colonial Secretary–2	29,014
Volunteers	184,121
Education	369,270
Printing and Stationery	73,557
Immigration	20,493
Census	5,000
Public Health	121,250
Pretoria Hospital	21,199
Grants in aid (general)	54,684
Grants in aid (local authorities) ..	60,450
Native Affairs	97,661
Game Preservation	5,500
Treasury	18,124
Internal Revenue	27,250
Audit	12,668
Customs	70,555
Posts and Telegraphs	420,679
Pension and Gratuities	11,300
Miscellaneous	10,000
Selati Railway	60,000
Inter-Colonial Council	83,000
Mines	124,656
Labour Importation	27,456
Lands and Surveys	63,987
Public Works	754,055
Irrigation and Water Supply ..	59,268
Agriculture and Forests	142,866

ESTIMATED REVENUE FOR THE YEAR ENDING 30TH JUNE, 1906, WITH COMPARATIVE STATEMENT SHOWING ESTIMATED REVENUE AND APPROXIMATE RECEIPTS FOR THE YEAR ENDED JUNE 30TH, 1905.

	Estimates 1904-5.	Approximate Receipts, 1904-5.	Estimates 1905-6.
CUSTOMS	£1,650,000	£1,580,000	£1,600,000
MINING REVENUE—			
Diamond Mines, Government share of profits £550,000, less half reserved for redemption of loan, &c., £275,000			275,000
Gold Mines profits tax	420,000	415,400	450,000
Base metal royalties		9,000	5,000
Licences and miscellaneous dues	400,000	345,000	33,000
Foreign labour passports		26,500	60,000
POSTS AND TELEGRAPHS—			
Postal	235,000	251,000	253,000
Telegraphs and telephones	145,000	155,000	152,000
TAXES ON TRADES AND PROFESSIONS—			
Trading and professional licences		117,000	50,000
Liquor licences	160,000	61,000	65,000
Other licences, including Boiler and Native Affairs Department licences		32,000	20,000
Auction dues	20,000	18,000	20,000
NATIVE REVENUE—			
Poll tax	300,000	490,000	365,000
Passes and miscellaneous	220,000	217,000	210,000
TAXES ON TRANSFERS OF PROPERTY AND SUCCESSIONS—			
Transfer duty	210,000	150,000	160,000
Estate duty	25,000	23,000	25,000
STAMP DUTIES AND FEES—			
General stamp duties		209,000	205,000
Bank note duty	210,000	1,900	2,000
Companies capital duty	30,000	58,000	43,000
LAND REVENUE—			
Farm and erf taxes	15,000	34,500	20,000
Township stand licences	55,000	51,000	50,000
RENTS—			
Government houses and buildings	20,000	20,000	20,000
Crown lands rents, interest and casual receipts ..	10,000	5,000	10,500
Native squatters		8,000	10,000
Concession rents		10,000	4,500
Bazaar and location rents		3,000	3,000
Interest	80,000	63,500	57,000
Fines and court fees	40,000	59,000	50,000
Miscellaneous	5,000	54,000	30,000
TOTALS	£4,250,000	£4,359,300	£4,545,000

The exports from the Transvaal Colony, apart from gold production, which accounted for an output of over 20 millions in the twelve months ending 1905, and diamonds, which in 1904-5 amounted in value to £1,198,530, consist of coal, wool, hides, skins and tobacco. Each of these branches is capable of indefinite expansion under scientific development. It is true the Colony has not yet emerged from the period of reconstruction incidental to the war, and consumption must largely exceed local production for at least another decade. During this period no considerable export other than gold, and in a lesser degree diamonds, can reasonably be expected. The activity of prospectors daily brings to light deposits of base metals, including tin, copper, iron, mica, asbestos, lead and silver ore, but up to the present the development of these deposits has not been of an extensive nature. The export of diamonds from the Transvaal, which before the war was nil, is chiefly the product of the Premier Mine.

Imports and Exports. — The following table shows the Customs returns for previous years. From an examination of these it will be seen that the Transvaal is dependent upon outside sources for nearly all it consumes. The articles of export being almost entirely made up of gold and diamonds, and of little bulk, directly affect the rate of in freights on all merchandise coming into the country. Imports have to bear a large proportion of the out freights which would be earned by the shipping companies did the exports consist of bulky articles such as wheat, wool, &c. :—

Year.	Imports.	Exports.
1896	£12,543,011	£9,000,000
1897	11,715,180	12,000,000
1898	9,996,574	16,000,000
1903	19,451,048	12,969,912
1904	13,627,377	17,770,988
1905	7,628,984	11,305,979

(to 30th June).

The import figures exclude specie. The 1896, 1897, and 1898 values do not include Government goods such as dynamite or railway material. The 1903, 1904, and 1905 figures exclude free importations for local Government or military stores and railway material imported as Government stores. The exports for 1896, 1897, and 1898 are estimates, no official figures being published.

Some idea of the dimensions of the trade of the Colony may be gleaned from the following tabled returns of the Imports and Exports of the Transvaal for the months of January and February, 1906.

Imports for February.	South African Produce.	Oversea Produce.
	Value.	Value.
Live stock	£59,199	£3,686
Articles of consumption, including wines, beers, and spirits	105,387	263,363
Raw materials and unmanufactured articles, including metals (bar, plate, and sheet)	17,515	62,766
Manufactured articles	55,447	820,186
Imported for the Transvaal Government		99,373
Specie	612	41,062
Total value	£238,160	£1,290,436

Total for January, 1906, South African produce £285,572, oversea produce £1,425,475. Imports through the post are included.

Exports.	January, 1906.	February, 1906.
Gold	£1,914,290	£1,735,744
Diamonds	4,486	147,112
Other produce, including wool and hair, skins and hides, tobacco, live stock, fodder and forage, coal and copper, wines and spirits, tea, fruit and vegetables (fresh and dried), fish (cured and salted), matches, and miscellaneous	66,716	61,159
	£1,985,492	£1,944,015
Imported goods re-exported	49,634	29,936
Specie	104,805	—
Total value	£2,139,931	£1,973,951

Imports from the United Kingdom	£854,293	£781,123
From other parts of the British Empire	417,879	341,383
From foreign countries	438,875	406,090
Exports to the United Kingdom, including gold and diamonds	1,921,632	1,887,656
To other parts of the British Empire	60,303	50,390
To foreign countries	3,257	5,969

Thus for January, 1906, 74·3 per cent. of the Transvaal's imports came from the British dominions, and for February, 1906, 73·4 per cent. In exports, other than gold and diamonds, the Transvaal despatched in January, 1906, 95·1 per cent., and in February, 1906, 90·2 per cent. to dominions within the British Empire. Including gold and diamonds, the proportion would be about 99·7 per cent. exported to British territory, and 0·3 per cent. to foreign countries.

Customs Union Convention, draft of which was laid before the various South African Parliaments on May 25, 1906, superseded the Convention of 1903. The general effect of the new tariff therein contained was to increase the *ad valorem* rate from 10 to 15 per cent., and to increase the rebate on goods from the United Kingdom and from reciprocating colonies from 2½ to 3 per cent.

Gold Output of the Transvaal.

	Value.
1893	£5,486,498
1894	7,667,152
1895	8,569,555
1896	8,603,821
1897	11,653,725
1898	16,240,630
1899	15,452,025
1900	1,481,442
1901	1,096,051
1902	7,301,501
1903	12,628,057
1904	16,028,883
1905	20,802,074

Diamond Output of the Transvaal.

	Value.
1901–2	£1,199
1902–3	46,358
1903–4	685,720
1904–5	1,198,530

Coal Output.

In 1904 the output of coal was 2,409,033 tons (of 2,000 lbs.) valued at £883,891.

The Customs Union.

On the 23rd March, 1903, an agreement was signed under which the Transvaal and Rhodesia entered the Customs Union, and a common tariff was established for all the South African Colonies. All transit dues were abolished, and considerable reductions made in through railway rates. Rebate is granted on articles manufactured in the United Kingdom of 25 per cent. of the duty in certain cases, and of the whole duty in those cases where it is 2½ per cent. *ad valorem* (ironmongery, &c.). A similar rebate may be made to any British Colony giving equivalent reciprocal privileges to the Union.

War Contribution.

In addition to a loan of thirty-five millions sterling, called the Development Loan, guaranteed by the Imperial Government, it was suggested in 1903 by the Secretary of State for the British Colonies, when visiting the Transvaal, that the Colony should contribute thirty millions towards the war expenses of the mother country by the issue of a loan of this amount, to be contracted by the Transvaal. The mining groups undertook to guarantee the first ten millions, if the loan were brought out at a time when the market was favourable. Since this understanding was arrived at the question of the proposed loan has fallen into abeyance. The economic progress of the Colony has since been subjected to a temporary check, the primary cause being scarcity of labour for the mining industry—the basis of the whole economic system, not of the Transvaal alone, but of South Africa

generally. The undue inflation of the prices of mining securities has been another factor in the depression, the consequent decline being persistent and continuous. The diversion of the attention of investors to enterprises outside of South Africa contributed to the fall.

Allocation of the Loan Fund.

The balance of the £35,000,000 loan (£5,000,000) was raised about the middle of 1904. The loan is secured on the general revenue of the Transvaal and Orange River Colonies, bearing interest at 3 per cent. per annum, with a sinking fund of 1 per cent. The allocation of the loan fund was as follows :—

Deficit of the Transvaal for 1901–2	£542,000
Debt of South African Republic	2,578,000
Compensation to loyalists in Cape Colony and Natal	1,564,000
Acquisition of railways	12,803,000
Repatriation and compensation	5,413,000
New railways	2,603,000
Other public works, including improvement of railways	2,395,000
Land settlement	1,976,000
	£29,874,000

The Crown disbursed to the Boers £3,000,000 mentioned in the Terms of Surrender, from Imperial funds; £5,000,000 were appropriated for repatriation and compensation from the guaranteed loan; £2,000,000 were granted from Imperial funds as compensation to British and foreign subjects and natives; and £2,000,000 paid by the War Office to protected burghers for certain obligations. A further sum of £2,500,000 was paid out in discharge of military receipts given during the war. The total amount provided for relief was thus £14,500,000, of which £2,500,000 was in payment for goods received.

The Inter-Colonial Council.

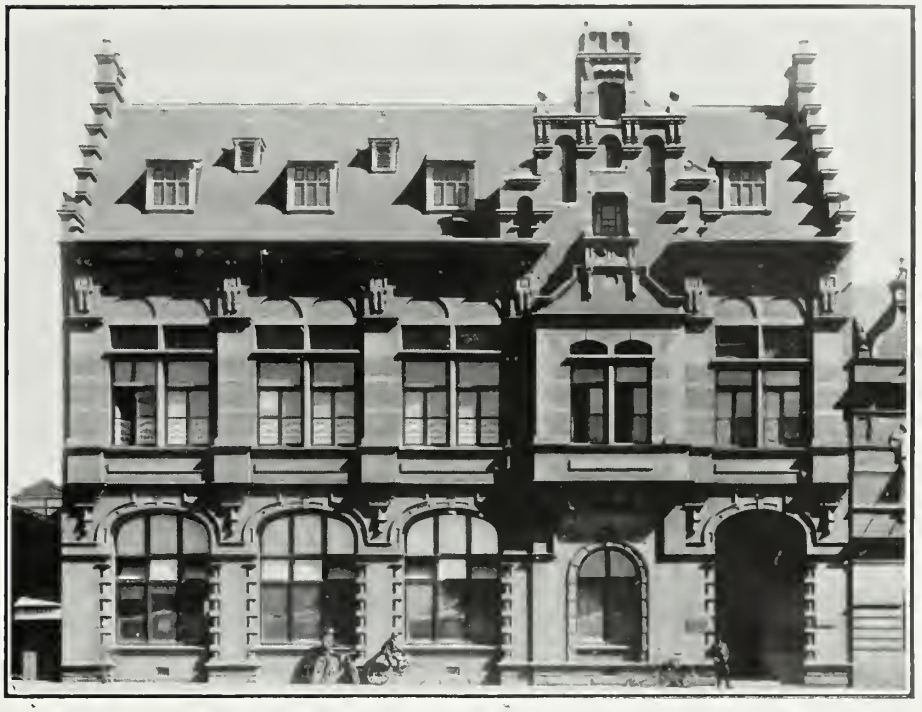
The Inter-Colonial Council, a quasi-federal body brought into being on the 20th May, 1903, by an Order in Council, is entrusted with the executive and financial control of the Central South African Railways system and the South African Constabulary, and has jurisdiction over the following expenditure common to both Colonies: —Expenses of the Governors' establishments in the two colonies; of the geodetic surveys, the Pension Office, the inquiry offices established by the two Colonies at the South African ports, and all other expenses that may be deemed necessary for the proper conduct of the Council's business. It may also have imposed upon it such other expenditure common to the two Colonies as the Colonies may conjointly see fit to entrust to it with the consent of the Secretary of State. The Council's revenue is derived from the net profits of the Central South African Railways remaining after expenses of working administration and maintenance and other necessary expenditure in connection with the railways have been provided for, and any other nett railway profits which may have become payable to the Governments of the two Colonies from any extraneous source. An excess in the expenditure over revenue would be met from the revenue of the two Colonies in proportion to their respective Customs revenues, or in such other proportion as the Secretary of State might decide.

The revenue of the Inter-Colonial Council for the year 1904–5 was £2,852,074, which included railway receipts £1,760,789, and contributions from the Transvaal and Orange River Colonies £995,000. The expenditure was £2,810,948, the principal items being :—Service of guaranteed loan £1,407,875, South African Constabulary £1,040,139. The balance on 30th June, 1905, was £41,090.

Internal Revenue Collections.

The internal revenue collections of the Transvaal have been as follows :—

Year.	Johannesburg.	Witwatersrand, including Johannesburg.	Rest of Transvaal.	Total.
1903–4	£832,495	£219,015	£1,267,370	£2,393,090
1904–5	897,792½	250 926½	1,341,580	2,416,089



The Netherlands Bank of South Africa, Ltd.: Pretoria Premises.

The Rand Water Board.

This Board comprises five members appointed by the Johannesburg Municipality, five members elected by the other municipalities on the Rand, ten members chosen by the Chamber of Mines, and a Chairman nominated by the Lieutenant-Governor. It was established to supply water to the Witwatersrand district (including the mines). The Board has taken over several waterworks formerly belonging to private companies, and now administers them as a whole. It has issued a four per cent. loan of £3,400,000 redeemable in 1935 for the purposes of its undertakings. The price for water distributed is 6s. per 1,000 gallons.

Banking Institutions.

There are six Banks carrying on operations in the Transvaal. Formerly there were seven banking institutions in the Colony, but the number was reduced by the voluntary liquidation

of the Robinson Banking Company in 1905. The capital resources of the banks are here shown :—

Bank.	Date of Balance-sheet.	Capital			Reserve Fund.
		Authorised.	Subscribed.	Paid-up.	
*The National Bank of South Africa, Limited	Feb. 28th, 1906.		£1,100,000	£1,100,000	£130,000
The Standard Bank of South Africa, Limited	"		6,194,100	1,548,525	1,997,050
The Natal Bank, Limited	"		1,741,160	500,000	300,000
Netherlands Bank of South Africa, Limited	"	£800,000		400,000	43,868
The Bank of Africa, Limited	"	3,000,000	3,000,000	1,000,000	645,000
The African Banking Corporation, Ltd.	"	2,000,000	800,000	400,000	140,000

* With power to increase to £4,000,000.

In accordance with an Act of the Legislature passed in 1893, banks transacting business in the Transvaal are required to publish a monthly balance-sheet for general information. The balances published in the *Government Gazette* of 23rd March, 1906, showed :

	Assets.		
	£	s.	d.
The National Bank of South Africa, Limited	7,429,994	12	11
The Standard Bank of South Africa, Limited	5,671,064	11	11
The Natal Bank, Limited	2,243,383	2	6
The Netherlands Bank of South Africa, Limited	902,664	1	8
The Bank of Africa, Limited	2,625,464	2	1
The African Banking Corporation, Limited	2,086,669	7	8

The following is a table of the published local clearing house returns which are largely influenced by transactions on the Johannesburg Stock Exchange :—

	Johannesburg.
Half-year to June, 1903	£91,714,044
December, 1903	61,892,847
June, 1904	74,199,939
December, 1904	81,309,280
Half-year to June, 1905 :	
January	16,093,293
February	12,470,339
March	14,813,239
April	27,569,134
May	18,407,504
June	13,436,018
	£102,789,527

The National Bank of South Africa, Limited.

During the régime of the South African Republic a Government concession was granted in 1890 to Mr Albrecht Frederiek Insinger and Dr. Wilhelm Knappe, of Berlin, for the formation of a local bank under the title of "De Nationale Bank der Zuid Afrikaansche Republiek, Beperkt." The Government undertook to subscribe £100,000 towards the first £500,000 capital, and to use the institution as a Government Bank. In the following year the Bank opened with head offices in Pretoria, where they remain under the altered title of "The National Bank of South Africa, Limited." The concession has been modified, the Bank having now no exclusive privileges. The London office is at Circus Place, London Wall, E.C. The capital was afterwards increased to £750,000, and subsequently to £1,100,000. A mint was established in connection with the Bank on behalf of the Government of the South African Republic, and the coinage of the State was issued therefrom. It was closed down upon the British annexation at the close of the Anglo-Boer war. On the occupation of the Transvaal by the military, Mr. Thomas Law, manager of the National Bank in Johannesburg, accompanied the headquarters staff to Pretoria, to advise Lord Roberts on the financial position of the Boer Government. At the twelfth ordinary general meeting of the shareholders of the Company it was stated that the Bank's investments figured at £731,000. These consisted of £564,000 British Government securities, £68,000 Colonial Government, and £99,000 Municipal securities. The National Bank is banker to the Government of the Transvaal Colony. There is a directorate of five members. The branches in the Transvaal are situated in Pretoria, Johannesburg, at Boksburg, Benoni, Brakpan, Cleveland, Comet Mine, Denver, Germiston, Langlaagte, Knight's Mine, Krugersdorp, Luipaard's Vlei, Maraisburg, Roodepoort, Randfontein, Orphiton, and Springs, on the Rand ; at Barberton, Bethal, Belfast, Carolina, Christiana, Ermelo, Klerksdorp, Heidelberg, Lichtenburg, Lydenburg, Middelburg, Pietersburg, Rustenburg, Piet Retief, Pilgrim's Rest, Pietpotgietersrust, Potchefstroom, Machadodorp, Modderfontein, Nylstroom, Ventersdorp, Vereeniging, Standerton, Volksrust, Zeerust, Wakkerstroom, Witbank, and Wolmaransstad, in other parts of the Colony. There is a branch in Swaziland. The Bank has ten branches in Cape Colony, five in Natal, one at Bloemfontein, and one at Lourenço Marques.

The Standard Bank of South Africa, Ltd.

The Standard Bank was the first South African banking institution to open business on the Witwatersrand gold fields, the first transactions being conducted in a tent, in 1886. The Bank was afterwards located in substantial premises in Commissioner-street, used at the time of writing, but to be superseded by a handsome block in course of construction at the corner of Harrison-street. There are several branch establishments in Johannesburg and along the Rand, and upwards of thirty branch offices in the Transvaal. These are in Johannesburg, Pretoria, Boksburg, Benoni, at the Comet Mine, Germistou, Springs, Krugersdorp, Roodepoort, and Randfontein, on the Witwatersrand ; at Barberton, Bethal, Heidelberg, Klerksdorp, Potchefstroom, Middelburg, Lydenburg, Pietersburg, Rustenburg, Standerton, Zeerust, and Volksrust, in other parts of the Colony. There are ten branches of the Standard Bank in Natal, six in the Orange River Colony and Basutoland, seven in Rhodesia, one in British Central Africa, two or three in Portuguese East Africa, and upwards of a hundred in Cape Colony. The Standard is one of the most deservedly respected banking institutions in South Africa. The head offices are in London, and headquarters for South Africa in Capetown. The Bank was founded in 1862, with a capital of £1,000,000, and eventually, in addition to absorbing several smaller local banking institutions, effected an important amalgamation with the London and South African Bank, an older company of high standing and repute. The subscribed capital is in course of increase to £6,250,000. There is a directorate of eight members. The Standard Bank is banker to the Government of the Cape of Good Hope, and to the Imperial Government in Cape Colony and the Transvaal.

The Natal Bank, Ltd.

The Natal Bank, which has its head office in Pietermaritzburg, Natal, was founded in 1854. The Bank first commenced transactions in the Transvaal by opening premises at Pilgrim's Rest in 1872. The Johannesburg premises

in Market-street, erected subsequent to the war, comprise a handsome corner block of five floors and basement. The Transvaal branches of the Natal Bank number upwards of fifteen, being situated in Pretoria, Johannesburg, Krugersdorp, and the country towns of Balfour, Barberton, Ermelo, Heidelberg, Nigel, Pietersburg, Standerton, and Volksrust. There are some twenty branches in Natal and Zululand, and one in the Orange River Colony. The Natal Bank transacts the banking business for the Government of Natal.

The Netherlands Bank of South Africa, Ltd.

This banking institution was established in Holland in 1888, with its head offices and directorate in Amsterdam. Simultaneously a branch was opened in Pretoria, and a second branch was opened in Johannesburg in 1890. The chairman of directors is Mr. A. Roelvink. South African branches of the Netherlands Bank are now in operation in Capetown, Johannesburg, Pretoria, Potchefstroom, Brugspruit, Witbank, and at the Premier Mine. Issue transactions are on similar lines to those of other local banks. The Netherlands Bank of South Africa represents in the sub-continent a large mortgage company called the Pretoria Hypotheek Maatschappij, having a total of £800,000 out on mortgages, and operations are being still extended. The head office of the Bank is in Pretoria, Mr. H. C. Jorissen being general manager. The managing directors in Amsterdam are Messrs. J. B. Loman and K. F. van der Berg.

Interior of the Netherlands Bank in Johannesburg.

The Bank of Africa, Ltd.

The Bank of Africa, with upwards of a dozen branches throughout the Transvaal, has its South African headquarters in Capetown, and head offices in London. There is a large branch establishment in Johannesburg, situated in Commissioner-street, and extensive operations are transacted throughout the Witwatersrand. The Bank of Africa is banker to the Imperial Government in Natal and in the Orange River Colony. It is governed by a directorate of seven members. There are Transvaal branches in the capital, at Johannesburg, Germiston, and Krugersdorp, on the Rand; and at Barberton, Lichtenburg, and Middelburg. The branches in Cape Colony number some thirty, those in Natal eight, in Rhodesia five, in Portuguese East Africa two. There are agencies at Abercorn, Blantyre, Chiromo, Chinde, and Fort Jameson.

The African Banking Corporation, Ltd.

The head offices of the African Banking Corporation, Ltd., are at London Wall, E.C., and the principal South African offices in Capetown. The Johannesburg branch of this institution has existed for some years, in succession to the Cape of Good Hope Bank, whose business and premises were taken over. On the site of the old offices a new structure was erected, situated in Fox-street. There are several branches in the Transvaal, and a large number of offices in Cape Colony. Branches also exist in the principal towns of Rhodesia, at Bloemfontein in the Orange River Colony, and at Beira and Lourenço Marques on the East Coast.

The Press of the Transvaal.

Johannesburg.

THE history of the Press in Johannesburg has been distinctly stormy, following as it did the lines of the financial and political upheavals that make the annals of the Rand. The majority of the journals circulating in the town prior to the war were uitlander organs devoted to political propaganda, and controlled by groups of interested persons in the mining or commercial world. It is an interesting reflection that while some of these have survived the war, no Boer organ in the Golden City was able to weather the storm. *The Standard and Diggers' News*, in which were amalgamated the old *Standard* and the *Diggers' News*, was the recognised mouthpiece of the Government, and its leading matter was consequently in a large measure unpopular with the industrial and commercial community. To it was opposed the *Star*, and later the *Leader*. Other papers issued along the Rand, mostly of Boer convictions, were conducted with the strongest political bias. Invective was freely indulged in on both sides, bitter feeling was roused and fostered, and prosecutions and suppression of uitlander opinions were frequent. The war, and subsequent peace, and the restriction of vituperative party press matter, put

an end to a very unwholesome state of affairs. Threats had been freely dealt in, and the attitude of the semi-official Boer press had been so truculent that it accounted for, while it hardly excused, the precipitate flight of the unarmed European population to the coast long before any real necessity for such exodus existed.

The oldest daily paper in Johannesburg is the *Star*, an afternoon journal published in three editions. It was started in 1889 by the late Mr. Thos. Sheffield, formerly of Grahamstown, Cape Colony. The *Star* has had an uninterrupted career of popularity and success. It is probably the most widely read of any Rand journal, and as an advertisement medium its connection is a large one. The editions vary in form from 12 to 24 pages. The first issue appears at 12.45 midday; the second, or "Reef" edition, at 3.30 p.m.; and the third and last edition is published at 4.45 p.m. The paper is owned by the *Argus* Company, the editorial offices of the journal being in the same building as the works, which are equipped with modern appliances and plant. A weekly edition is also printed. The political history of this daily paper is full of interest. A staunch upholder of British rights and traditions, it laboured manfully in the uitlander cause prior to hostilities, the editor being a gentleman who had been on the staff of the London *Times*. It was widely believed that the policy embodied in the *Star's* leading artieles was inspired by the late Mr. Rhodes and the lady then known as Miss Flora Shaw, special colonial correspondent to the London *Times*. This "fighting" editor, after his enforeed departure from the Rand in 1899, held for some time an important position on the staff of the Military Governor of Johannesburg at the time of the British occupation, after which he resumed his editorial duties. The position was filled in 1905 by Mr. Geoffrey Robinson, who had for several years held the appointment of private secretary to Lord Milner in the Transvaal. The circulation of the *Star* is very extensive. A point of interest in its history was its suppression by the Government of the South African Republic for articles written at and in defiance of the administration. During the seven days the interdict lasted the journal was issued daily as usual under the name of the *Comet*. The penalty was then withdrawn, and the paper resumed its normal course.

The *Transvaal Leader* succeeded the *Johannesburg Times* in 1898, under the management of Mr. C. F. King. The policy of the defunct *Johannesburg Times* was that of South Africanism, as opposed to Krugerism; but the new journal, under its editor, Mr. R. J. Pakeman—formerly a well-known journalistie personality in Barberton—pursued a policy of such slashing attack on and critieism of the Kruger administration, that it shortly became the most popular uitlander organ on the Rand. In the short period between its first appearance and the declaration of war, this journal worked up a tremendous amount of public excitement. Its premises were raided more than onee by agents of the Boer police, and finally the editor was charged with high treason and placed under arrest. Being released on bail, he ill-advisedly estreated his bail and fled the country, with the connivance of the Government officials, who only desired his departure. With the conclusion of peace the *Leader* reappeared in Johannesburg, and the first issue on June 2nd, 1902, eontained news of the signing of the Vereeniging contract, dealing with the terms of the Boer surrender. For a brief period Mr. Pakeman resumed the editorship, but Lord Milner dealt far more ruthlessly than did even Mr. Kruger with the "Lighter Vein" column, a feature of the journal that aimed at political satire, and that disappeared from its pages within a few days of the *Leader's* re-appearanee. Mr. Dawson suceeeded Mr. Pakeman as editor in 1903. The paper has beeome the property of the *Cape Times*, Ltd., to whom the original owners disposed of it. It is produeed in its own buildings, where the printing, lithographie, and other illustrative work is eonduеted. The weekly edition of the *Leader*, well illustrated, is a very popular publieation. The poliey of the *Leader* sinee the war is mainly that of the Government, Imperialistic and progressive. The paper enjoys a large eireulation. Its sporting eolumns are of special interest and completeness. The tone of this journal is sober, and as sound in regard to social matters as it is staunch in those politieal. Its attitude, therefore, is in striking eontrast to that adopted prior to the war.

Publishing Offices of the "Star," the oldest Johannesburg Daily.

The *Transvaal Critic*, a weekly Johannesburg journal originally founded by Mr. Henry Hess, was for some years a thorn in the side of the officials of the South African Republic, whose lapses from dignity and public honour were unfailingly searched out, faithfully recorded, and scathingly commented upon. On its re-appearance after the war it pursued the same policy of faithful dealing with the new administration, and, despite its failure to defend in one particular action for libel, has always received the support of the public, who are perpetually in the expectation of some startling exposé. The tone of the *Critic* is caustic, its criticisms are most unsparing, and many public scandals both under the old and new régimes have been put under the searchlight by its agency, and remedied. Needless to remark, it is not what might truly be termed a popular organ in administrative circles, but the Transvaal public owes it a debt of gratitude for its courageous action in matters of public importance. This paper is issued weekly, and follows the custom of the Capetown *Owl* of presenting with each issue a complimentary "cake" to the perpetrator of the most daring, absurd, or public-spirited action during the week before publication. It is controlled by a syndicate of Johannesburg business men, and has a large circulation.

Of new papers since the war, the *Rand Daily Mail* is one of the most successful Johannesburg journals. It is owned, published, and printed by the African Daily Mails, Ltd., in Johannesburg, and was first edited, in 1902, by Mr. Edgar Wallace, a gentleman who in pre-war days achieved some slight literary distinction in the Cape Peninsula as a writer of verse in imitation of Mr. Kipling, and during the war was special correspondent in South Africa for the London *Daily Mail*. The paper was an undoubted success from the start, and on Mr. Wallace seeking literary preferment in other parts of the world Mr. R. J. Pakeman became editor of the *Rand Daily Mail* in his place, having given up his appointment on the *Transvaal Leader*. His position was relinquished towards the close of 1902. Under Mr. Pakeman's control the paper greatly increased in popularity. The journal has continued to flourish and to attract a large class of readers. Its policy is a broad democracy with an Imperial bias, and its columns provide entertaining matter for every section of the community.

Offices of the "Transvaal Leader," Johannesburg.

The *Sunday Times* (the first venture in the shape of a seventh-day paper in South Africa) first saw the light in February, 1906. It is a bright and interesting weekly, and contains matter for social, literary, and political entertainment, in addition to latest cable and telegraphic news. The *Times* is printed by the South African Mails, Ltd., for the *Sunday Times* Syndicate, Ltd., and published by the Central News Agency, Ltd., Johannesburg.

The *Rand Ratepayers' Review*, which died a natural death, and the *Transvaal Review*, which succeeded it, were pro-Boer and negrophile—an amazing combination.

The *Daily Express*, a new venture produced at the end of 1905, under the able editorship of Mr. R. J. Pakeman, pursued a policy directed against the mining magnates, particularly on the Chinese question. It had a short-lived existence, suspending with its 84th number. Mr. Pakeman died in July, 1906. Of ladies' papers, the Rand has produced one or two, neither of them very striking or very widely circulated. Finance is represented by the *South African Mines*, which is edited by Mr. Clem Webb, a well-known pre-war figure among the reformers. There is also the *Licensed Victuallers' Gazette*, and one or two church and religious publications which appear monthly.

De Transvaler, a weekly paper published at Fordsburg, Johannesburg, was started in 1903, the proprietary being Messrs. Hultzer & Das. The policy of this journal, which is extensively supported—mainly by Dutch subscribers—throughout the Transvaal and also in Rhodesia, British Bechuanaland, and Cape Colony, is on broad South African lines. The editor is Mr. Paul G. H. Das, and the editorial offices are in Fordsburg suburb. The journal is printed in the Dutch language.

The *South African Jewish Chronicle*, published weekly in Johannesburg,

was originally started in Capetown by the present editor and proprietor, Mr. L. Lionel Goldsmid, B.A., M.J.I., J.P., as a fortnightly journal. The first issue appeared on February 7th, 1902. In January, 1903, the journal commenced weekly issue. After publishing for three years in Capetown, it was removed to Johannesburg, its first issue in enlarged form appearing in that town in May, 1905. The *Chronicle* is now published in three editions, special issues being distributed in the Cape Colony and Natal. Although religious in its bias, the paper contains matter of secular interest. Particular attention is paid in it to mining and financial matters, while special articles in its columns upon the Stock Exchange are accepted as authoritative. Amongst members of the staff of the *South African Jewish Chronicle* whose work has helped to popularise the journal may be mentioned Mr. M. Simon, B.A. (Oxon.), assistant editor, and Mr. W. Scott, mining editor. The *Chronicle*, which is issued at 3d., has one of the largest circulations of any weekly paper in South Africa. It is the mouthpiece of the influential Jewish section of the population, and, while representative of orthodox Judaism, has won respect by the fairness with which its columns are freely opened to those of opposing views.

Among well-known names in Rand journalism may be mentioned those of Mr. Ben Viljoen, who held a command during the war, and the late Mr. Joseph van Gelder (formerly editor of the *Standard and Diggers' News*), who during the latter portion of the war acted as special correspondent in Holland for the London *Daily Mail*. Mr. Viljoen was on the staff of the *Krugersdorp Sentinel*, and Mr. van Gelder at the time of his death was a member of the staff of the *Critic*, in whose columns his crisp and humorous style was easily recognisable. Although some undeniable talent has assisted in assuring popularity to some of the Transvaal journals, there has been on the whole a lack of brilliancy, and, with the exception of the first editor of the *Leader*, few journalists in the country have succeeded in impressing their personality on the public mind. Government pressure and interference, more particularly under the old régime, has been a lamentable feature of the history of the Press in the Transvaal, and has been a greater factor in stifling the real expression of public feeling than all the bribery and corrupt practices which are supposed to flourish so riotously on Transvaal soil.

The Johannesburg newspapers produce a larger amount of cable news, representing greater money value, than any other papers of the same standing in the Empire. The price per issue is 3d., no copper coinage value having been obtainable in the Transvaal until recently.

Pretoria.

The Press in Pretoria is represented by several journals, the oldest being the *Transvaal Advertiser*, the utterances of which were always grateful and comforting to those of settled Imperial convictions. The *Volksstem*, the leading Boer organ, is also published in the capital. It voices the sentiments of the Dutch section. During the period of suspense prior to the outbreak of war, invective was freely indulged in by this publication. Since the advent of peace the *Volksstem* has pursued its even way of racial prejudice and ingratitude to the British administration. It has a large circulation throughout the Transvaal and in the other Colonies among the Dutch.

The *Pretoria News* came into existence just before the war as a tri-weekly paper, and was inaugurated as an evening daily in December, 1902.

The *News* supports on general lines the Progressive party, but is an independent organ, and not controlled by the party. It takes an enlightened and advanced view of the native question, and its avowed aim is to help in the re-building of the Transvaal Colony upon honest Imperial British principles. The paper issues at 3.30 and 4.30 each afternoon, and has a large circulation. The *News* is published by the Pretoria Printing Works, Ltd. Its editor is Mr. Vere Palgrave Stent.

The *Government Gazette*, which is produced in Pretoria, contains all Government announcements and proclamations, and the text of all ordinances. It is published from the Government Printing Works, which were established in 1887 as the "Staats Drukkerij" of the former Republic. The Government of the South African Republic purchased the printing plant of the late Mr. Jan Celliers to institute a departmental system of printing. The new offices were well equipped, in commodious buildings. The Boer Government, on its hasty retreat from Pretoria to the precarious security of a saloon carriage on the railway in 1900, bore off much of the plant and converted it into a field printing press. This was eventually taken possession of by the British authorities at Komati Poort. A complete lithographic plant ordered and paid for by the Boer Government, and lying in store at Delagoa Bay, was also handed over to the British administration. The entire equipment being foreign, and supplied for use in the Dutch language, many alterations and additions became necessary; but subsequently this department was placed on a thoroughly sound footing, with one of the best printing plants in South Africa. Work has been done both for the civil administration and the military, and on two occasions the printing staff received the thanks of Lord Kitchener for the rapidity and accuracy with which the work was turned out. The number of employés at the Government Printing Works is upwards of 150. The precursor of the *Government Gazette* was known as the *Staats Courant*, and one or more numbers of it are said to have been issued from the saloon carriage near Komati Poort.

Land en Volk is a weekly paper published in the Dutch language under the editorship of Mr. L. D. De Haas. Its policy is an independent one; it aims at placing before the country population unbiassed views upon the most important questions of the day, and at acting as a sort of brake on the agitation of the extreme Boer party. Before the war this journal was the recognised Joubert or anti-Kruger organ. Besides its old subscribers, it now commands a large circle of readers who aim at co-operation with the British people, while maintaining the traditions of the Afrikander race. It is believed that *Land en Volk* is destined to play a leading part in the future political life of the Transvaal and of South Africa.

The Provinces.

The *Heidelberg News* was established in 1895 by Mr. H. Weakley, formerly editor of the Colesberg (Cape Colony) *Advertiser*. The paper, published weekly, appears on Fridays. It maintains a British Imperial policy, while adhering to the principles of absolute self-government for the Colonies. The *News* does not favour either the Progressive or the "Het Volk" parties, but is more in line with the Transvaal Political Association—an organisation with headquarters in Pretoria. The circulation of the paper is mainly confined to the Heidelberg district, which includes Balfour and Greylingstad, the Coronation Reef and Nigel gold-mining properties, and the Government Land Settlement colony at Beerlaagte.

The *East Rand Express* is printed and published at Boksburg, a growing township halfway between Johannesburg and Springs, the easternmost extension of the reef. Messrs. Geo. Constable & Co., Ltd., are the owners and publishers. The East Rand is an important district, and aspires to taking a leading part in politics; and this paper, which appears twice weekly, is mainly devoted to such. It started, in the same hands, prior to the war. Its policy is democratic, and opposed to capitalism.

The *Times of Swaziland* was established towards the middle of 1897, being controlled by the proprietors of the Printing and Publishing Monopoly of Swaziland. The editor is Mr. Allister M. Miller. The offices are at Embabane, the centre of administration for Swaziland. This journal is published weekly, appearing each Saturday. It is the only newspaper circulating in Swaziland, and distributes among the farming districts of the Eastern Transvaal where the Government Land Settlement scheme is in operation. The *Times* devotes itself to the general development of the country and its mining and agricultural interests. It includes among its subscribers members of all classes of the community who have interests in Swaziland and the Eastern Transvaal.

The *Volksrust Recorder*, a weekly journal published each Saturday at Volksrust, is controlled by the *Recorder* Syndicate, the chairman of which is Mr. S. Bromley Kemp, J.P., of Volksrust. The editor is Mr. H. V. Sheehan. The *Recorder* was established towards the end of 1903. It has many Dutch and English subscribers in the Wakkerstroom district, and circulates throughout the eastern provinces and other parts of the Transvaal, and Northern Natal. The policy of the journal is avowedly Progressive, and devoted to the advancement of the general welfare of the district.

The *Klerksdorp Mining Record* was established in August, 1889, by Mr. H. M. Guest, who in July of that year took over the *Representative*, a paper which had been started in November, 1888. The "boom" of that time, though waning fast, was still vigorous enough to promise a prosperous career for the new journal, but the bad time which resulted in the disappearance of several Transvaal newspapers soon came round and made the work of maintaining an independent paper in a country dorp very difficult. The *Record* survived the difficulties of the time, however, and in November, 1897, changed from a bi-weekly and commenced issue three times a week. The *Record's* politics were always progressive and distinctly British. As the war cloud of 1899 lowered, it became evident to the intrepid publisher that its issue must cease. In August, 1899—exactly ten years from its first appearance—the paper ceased publication, and a month later its proprietor-editor and family left all and entered British territory. Mr. Guest returned to Klerksdorp in February, 1901, and in September, 1902, received permission from Government to resume publication, and the journal recommenced its tenure of existence under the name of the *Klerksdorp Mining Record and Western Transvaal News*. It is a double royal paper, and is issued each Tuesday and Friday afternoon.

Office of the "Zoutpansberg Review," Pietersburg.

Mr. W. Brown, Editor and Proprietor of the "Zoutpansberg Review," Pietersburg.

The *Lydenburg News* was started on the 17th September, 1904, by a small local syndicate of the same name, and has progressed considerably since its inauguration, in spite of the depression manifest throughout the district. The management intends to publish as soon as practicable a Dutch edition of the *News* in order to meet the wishes of such of the surrounding farmers as may be unacquainted with the English language. The policy of the paper is that of the "Responsible Government" and "Het Volk" parties, and its aims are to further the unrestricted mineral and agricultural development of the district of Lydenburg in particular and of the Transvaal in general. The present editor is Mr. T. Craig. The *Lydenburg News* was preceded by *The Transvaal*, which was first published in November, 1887, by Mr. John H. Parker, and in June, 1893, was acquired by Messrs. P. Joubert & Co., who in due course were succeeded by the *Druk Maatschappij* in December, 1898, and the paper was continued by that Company until the declaration of war in October, 1899. A Dutch paper which made its appearance imme-

diately after the Jameson Raid in 1896 then took its place, and continued under the name of *De Lydenburger* till the occupation of the town of Lydenburg by the British troops in 1900.

The *Zoutpansberg Review* (Pietersburg) is one of four newspapers published in the Northern Transvaal which are issued twice weekly. The *Review* appears on Tuesdays and Fridays, and voices the opinion of the district on all matters of public importance. Its policy is Progressive, on independent lines, and its subscribers include not only the inhabitants of the district, but readers in other parts of the sub-continent and oversea. The circulation extends as far north as the Limpopo. The paper was established in 1888, and was first issued bi-weekly in 1903. The proprietor is Mr. William Brown, who claims to be one of the oldest newspaper proprietors in the Transvaal. The editor is Mr. Lewis E. Sessel. The firm also publishes a weekly paper entitled *De Zoutpansberger*, in the Dutch language, which has a wide circulation in the Zoutpansberg. Another weekly paper in course of establishment by Mr. Brown is to be named the *Waterberg Advertiser*, which will be produced at Nylstroom, as successor to *De Waterberger*, which ceased issue in August, 1905. In 1904 Mr. Brown produced a native paper entitled *Leihlo La Babathso* ("The Native Eye"), which only had a short existence. This is, however, to be revived.

The *Western Chronicle and Potchefstroom Budget* is a weekly publication which upholds the interests of the pretty little capital of the Western Transvaal, and voices the opinion of the large agricultural population of the Potchefstroom district.

The *Gold Fields News and Barberton Herald*, published twice weekly in Barberton, De Kaap Gold Fields, is a journal which has always maintained a staunchly British and Imperial policy, and is one of the smartest of the Transvaal provincial papers. The *News* was established in 1887, and the *Barberton Herald* was incorporated with it in 1889. Owing to the distance from the Rand, this is the only newspaper enjoying an effective circulation in the district. On more than one occasion the *News* came into conflict with the Republican Government through its outspoken criticisms. The paper has a full cable and telegraphic news service, and makes a feature of special articles on topics of value to the urban population. The *Gold Fields News* is published by Messrs. A. W. Bailey & Co., of Barberton and Lourenço Marques. The editor is Mr. Howard H. Birt.

The Transvaal Museum.

ALTHOUGH the Museum and Zoological Gardens (Pretoria) are connected in the minds of most people as being under one and the same administration—and, indeed, up till June 30th, 1905, were actually thus combined—yet from July 1st of that year the Transvaal Museum has been raised to the dignity of a Government Department, administered by the Colonial Secretary as exclusive head. For this reason the writer purposes dealing with the two institutions separately. The Museum was started in 1892 by means of an annual grant from the Government of the South African Republic, amounting to £500. An honorary Curator was appointed, whose energy and unremitting care so improved the institution that it was resolved to dispense with the honorary appointment, and the gentleman who is at present Director was installed in that capacity. The Government grant was raised from time to time, until in 1896 it amounted to £2,000, a sum which was shortly raised to £6,000 as it became realised that the growth of the institution necessitated greater expenditure. A further yearly increase of £1,000 was guaranteed until the sum should reach the annual amount of £10,000. Shortly afterwards, however, the war broke out, and during the years 1899–1902 very little advance was made. But since the British Government took over the administration of the country the institution under notice has been quickened into new life, buildings which were commenced under the former Government have been completed, and numerous fine show cases added, at a cost of some £14,000, thus permitting of the

Entrance to Zoological Gardens and the Transvaal Museum, Boom-street, Pretoria.

proper scientific arrangement of the specimens. The main object which the management has kept in view is the collection and exhibition of every-

THE TRANSVAAL MUSEUM BUILDINGS, PRETORIA.

thing that is of zoological, botanical, historical, and ethnographical interest, preference being given to Transvaal exhibits over those of South Africa generally, and to the latter, again, over foreign exhibits. Admission to the museum is free; and it is intended shortly to erect turnstiles, in order to check the exact number of visitors entering the building. The administration of the institution is in the hands of a Board of Management consisting of ten Pretorian residents, including the Chairman, who are appointed by the Government. Regular monthly meetings of the Committee are held for the despatch of business. The staff of the Museum comprise seven officers, including a lady who is in charge of the botanical collections, and two lady clerks and typists. Dr. J. W. B. Gunning is the Director. The collection of specimens was originally exhibited in a hall in Market Buildings, Pretoria, but the available space was quite inadequate for the rapid development which took place, and the present new building in Boom-street was commenced. It was completed by the British Government after the occupation, but it was not until during the year 1905 that everything in the way of fittings and arrangement of specimens was brought to a sufficiently satisfactory state to admit of the formal official opening of the institution. This interesting function was performed on December 15th, 1904, by H.E. the Acting Lieutenant-Governor (the Hon. Sir Richard Solomon), in the presence of a large attendance of the general public. It is satisfactory to note that after a test of more than a year, the fittings of the Museum have proved to be of first-class quality, being practically air- and dust-proof; and thus an effectual check has been placed upon the ravages of insects. The distance from Pretoria station to the Museum is about a mile, and the journey is best performed in one of the numerous conveyances which are always procurable at the station. Proceeding down Market-street, very nearly to the lower end of it, the cross road known as Boom-street is reached, and the substantial buildings which constitute the Museum come into view on the right. The fine well-appointed house at the corner of Market-street and Boom-street is the residence of the Director and his family. Passing along the south boundary of the Zoological Gardens, the Museum entrance gates are reached, about a hundred yards beyond the lodge gates of the Zoo. The Museum building is of modern architecture, in shape an open rectangle, there being an extensive court-yard—gay with flowers during the summer months—in the centre, the various offices and exhibition halls being situated on either side and at each end. The structure is of brick on a massive stone foundation, with a frontage of 156 ft., and running back 180 ft. The dimensions of the central court are: Length 100 ft., width 69 ft. The total cost of the building was about £25,000, and that of the fittings over £14,000. The ordinary visitor would pass through the entrance hall into the central court, and thence, turning to the left, would commence his tour of inspection in the African mammals hall. For the present purpose, however, he may be supposed to be a friend of the Director of the institution, and warranted in knocking at the door on the left side of the entrance hall, and thence commencing his tour. Summoned to enter, the visitor, if at all observant, will learn much from his survey of the fine roomy study, office, or library—

No. 2 Hall, with square-mouthed Rhinoceros.

Case of South African Antelopes in No. 3 Hall.

call it what one will: as a matter of fact it is a combination of the three. It at once gives the head of the institution away as being a man full of energy, and absolutely devoted to his work, and it furnishes an explanation of the sudden and rapid growth of the Museum and its companion institution, the Zoological Gardens. From this office a door opens into No. 1 hall, about 40 ft. by 25 ft. in dimensions. The cases which line the walls on all sides contain the exhibits of African avi-fauna, a remarkably good one. The mounted specimens number 951, representing 310 species, while in drawers of the central cabinet is a collection of "made" skins numbering 2,144, representing 526 species. The collection of accipitrines exhibited is a particularly fine one, many, in fact most of the specimens, being excellently mounted. The martial eagles, the crowned eagles, and the fish eagles are very life-like presentments of these grand birds. A fine pair of southern lammergeiers are well worthy of notice, as is a beautful little specimen of the rare pigmy falcon. The eagle owls, which are placed with the accipitrines, are also well treated. In several cases birds are shown with their nests and eggs or young. There is a red-necked falcon on its nest, young Wahlberg's eagles in nest, and rooks with nest and eggs. But the most striking exhibit, in the writer's opinion, is that of the goliath heron, with nest and eggs, which were secured at no small personal risk and difficulty by Mr. C. B. Horsbrugh, and presented by him to the Museum. It may be here remarked that every specimen exhibited throughout the collection is card-catalogued, thus rendering it a simple matter to trace the history of each one acquired. The cabinets in the centre of the hall contain in the lower drawers the "made" skins of birds above mentioned, the glass cases on the top being devoted to a display of South African birds' eggs and shells, and to a collection of botanical specimens, showing dried specimens as well as fruit of many South African plants of economic value, together with sections of wood and photographs of the whole plants. From this hall the visitor will pass on to No. 2 hall, which together with No. 3 hall is almost entirely devoted to the exhibits of South African mammals. In the former hall is a good specimen of a square-mouthed rhinoceros cow. This is the so-called white rhinoceros. The specimen in question is well mounted, and is of great interest in view of the extreme rarity of this huge beast. There are but very few individuals of *Rhinoceros simus* alive at the present day; but some are being carefully preserved in Zululand by the Natal Government. The mounted specimen in the Museum was presented by Mr. Carl Jeppe. The hippopotamus does not strike the writer as being either a fine specimen or satisfactorily mounted. Jackson's wildebeeste is an interesting exhibit, though this is an East African, and not a South African

Bushman Stone Carving, representing an Eland, found on the Veld between Mafeking and Klerksdorp, now in Museum.

Bushman Stone Carving, representing an Oryx, picked up on the Veld between Mafeking and Klerksdorp, now in Museum.

form. The same remark also applies to the Semmering's and the singular Waller's gazelles. The baboons and catarrhine monkeys make a good show. The second hall also contains a skeleton of a manatee, and mounted specimens of the scaly ant-eater (*Manis*), and the singular aardvark, or earth hog. Collections of horns mounted on the frontals are displayed over each doorway arch. In No. 3 hall are good specimens of koodoo, roan and sable antelope, and gemsbuck. Other South African antelopes and mammals are here displayed. The mounting of the zebras leaves much to be desired, however, and the sensational "piece" of a lioness attacking a zebra cannot possibly be taken seriously, there being no attempt at modelling in any portion of it. A fine mounted specimen of a crocodile is displayed over the doorway, and the nucleus of a

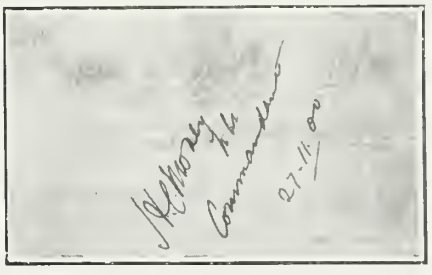
Bushman Stone Carving (representing the "Aard-Vark" or Ant-Bear) found between Mafeking and Klerksdorp. (Now in Museum.)

collection of fish fauna from South African seas is also exhibited. It comprises several valuable specimens, and it is understood that the Museum is indebted to Dr. Gilchrist, the Marine Biologist of the Cape Government, for the whole collection. A door leading from the lower end of No. 3 hall opens on to the library. This department was unfortunately incomplete at the time of writing, though gradually becoming of considerable interest. It contained about 2,000 volumes. The visitor should now proceed to No 4 hall, which is situated to the immediate right of the entrance to the central court. Here is displayed a most interesting historical and ethnographical collection, which many people will no doubt consider the finest feature of the Museum. Some Bushman stone carvings, or more correctly chippings, are quite unique in their way. They were found on the veld between Mafeking and Klerksdorp. The creatures represented on these stones by this artist of past days are an eland, a gemsbuck, and an antbear; and it will be readily seen from the accompanying illustrations that a considerable amount of artistic skill was brought to bear upon the work. Note the excellent perspective on the offside horns of the two antelopes, the manner in which the folds of the neck skin are delineated, and the contour of the dewlaps. The Bushman paintings which are exhibited close by are very crude and unsatisfactory in comparison with these chippings. There is a very fair collection of weapons, tools, musical instruments, utensils, and articles of dress used by the Swazis, Zulus, Mashangana, Makatees, Magwamba, Mawemba, Basuto, Maraleh, Mashuna, Barotse, and Mozambique natives. Amongst the most interesting of these are the war drums, native piano, the carved woodwork and basketwork of the Maraleh, and the wood carvings (including a huge weird-looking monster which did duty as Malaboch's idol) of the Basuto. There are also some exceedingly valuable Bornean exhibits, including fans, spears, idols' clothing, and an excellent model of a native house. But the most interesting case to the average South African will probably be that containing historical mementoes of the Transvaal of the past. These include an excellent model of an old *voortrekker's* wagon, also one carved out of bone; a bust model of the late President Kruger; old Dutch bibles, one of which, published in 1756, contains the register of the Pretorius family, and another of the year 1736; and the old Dutch hymnbook, bible, and other relics of the *voortrekker* leader Piet Retief. An interesting memento in the case is to be seen in an old-fashioned wooden calendar made and used by the *voortrekkers*. By an ingenious method of pegs and holes a record of the passage of time, day by day and week by week, was kept by the intrepid emigrants when far removed from civilisation. Old manuscripts and such like are represented by a proclamation issued by Landdrost Stockenstroom, dated November 26th, 1815, from Graaff-Reinet; a copy of the *Camp News* published during the siege of Pretoria in the British Camp, in 1880–81; *Government Gazettes* of the "Nieuwe Republiek"; a number of poems written by H. van der Bergh in 1785 (saved from the battle on the

Treasury Notes of the South African Republic. (Specimens now in Museum.)

Original size of each note 3¼ in. by 2¼ in.

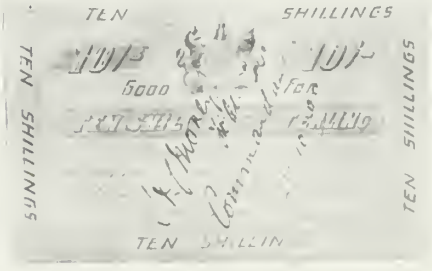
occasion of the Zulu chief Dingaan's defeat in 1838); and a Wesleyan hymnbook, damaged by a cannon ball during the siege of Potchefstroom in the struggle of 1880–81. Admirers of H. Rider Haggard's romances can here see the original deed of transfer, to the author, of the ground in Pretoria



"Good-for" issued to the Boer prisoners in the Camp at Green Point, Capetown.

Original size 4⅞ in. by 2¾ in.

whereon stands "Jess's cottage." A copy of the new Transvaal Constitution, 25th April, 1905, printed on silk, is also exhibited. Amongst relics of the Boer prisoners of war which have been collected is a violin of local wood made by a prisoner at St. Helena, and some allegorical carvings intended to delin-



"Good-for" issued to the Boer prisoners in the Camp at Green Point, Capetown.

Original size 5¾ in. by 3¾ in.

eate the Presidents and the best-known officials of the two late Republics. A bullet fired from a British rifle at the battle of Boomplaats, in August, 1848, is carefully treasured; also a ball fired by the British from a gas-tube "cannon" in Fort Mary during the siege of Lydenburg, 1880–81. The "office seal" of the Klein Vrystaat ("little Free State") is of interest; also an I.R. stamp used by the Department of Education during the first British occupation of the Transvaal. A striking exhibit and one of peculiar interest is a complete suit of clothes worn by a member of the notorious Jack Hindon's train-wreckers who served with the Boers during the 1899-1902 war. The hat is made from the stomach of an ox; the coat, from baboon, blesbuck, and goat skins, sewn with sinews; the trousers are of skin roughly tanned; the boots are "protected" with buttons cut from cushions taken out of railway carriages. Hindon's corps was known as the "Transvaal Vrywilligers." A number of household articles made by *voortrekkers* a century past, together with several muzzle-loaders, elephant guns, and flintlock pistols used by the early Boer hunters, complete the relics of historical interest contained in the case. There are in the possession of the Director of the Museum numerous other relics of the *voortrekkers*, also a diary, written by Commandant Trichard, of the "trek" under his leadership, which are to be added to the exhibits. Many interesting portraits in oils of Boer celebrities hang round the walls. These include the late President Kruger and General Joubert, Commandant-General Pretorius and

Hall with non-African Animals, Transvaal Museum.

President Brand. In the centre of this hall is a series of cabinets in which are displayed a few representative species of each family of insecta and specimens of mimicry, dimorphism, and polymorphism. In addition to these are some most interesting stone implements, a large conchological collection, and some crania. The insect specimens are exhaustive, the South African *Rhopaloecra* being nearly complete. The whole of the insecta comprise about 100,000 specimens. There is a very interesting collection of coins and Transvaal paper money. The former include coins of the reign of Henry III. of England, Cromwell, Henry VIII., William and Mary, and of George I., George II., and George III. There are also several Dutch East India Company's coins, and a complete set of British Jubilee coins. Passing on to No. 5 hall, which, with No. 6 adjoining, is mainly devoted to mammals not indigenous to South Africa, the visitor will notice the fine mounted specimen of an elk, and a numerous group of Australasian marsupials and other mammals. Amongst the latter are kangaroos, wallabies, bandicoots, opossums, dasyures, the wonderful duck-bill (*Ornithorhyncus*), and that other queer egg-laying mammal, the Echidna. Good specimens of that singular group of Indian mammals, the water chevrotains, are exhibited, as also Indian black-buck, llamas from South America, and ant-eaters from Central America. The marine mammals are represented by dolphins and porpoises. Some interesting birds are also placed in this hall, birds of paradise, pheasants, parrots, swans, peacocks, American troopials, Australian coots, black grouse, and flamingoes. A very interesting exhibit is the skeleton of the Ichthyosaurus, and several other fossil remains claim attention. A very ordinary-looking mummy, of the usual antiquity, is placed in the centre of the hall. Near by is an object of considerable interest, consisting of a most complete and perfect working model of the Castle Line mail steamer *Dunvegan Castle*, presented by the directors of the steamship company to the late President Kruger. The cost of this most beautiful construction was a thousand guineas. The model is enclosed in a substantial and handsome case, presented to the Museum by the late President. In the adjoining hall, the last of the series are exhibited, European red and fallow deer, zebu-bears, Indian tiger, puma, leopards, European wolf, badgers, Japanese binturong, marmots (the "prairie dog" of America), agouti, peccaries, and a group of Indian and American monkeys. There are also good specimens of seals and sea-lions, while exhibits of fossil fish and reptiles adorn the walls. There is a mounted skeleton of an Indian elephant also in this hall.

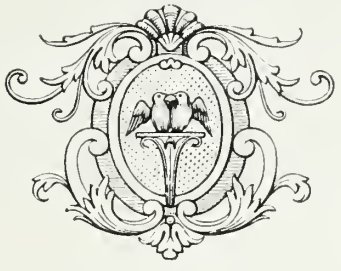
Chief Taxidermist and his Assistant at work, **Transvaal Museum.**

As might be expected, there are specimens in this large collection the mounting of which is anything but satisfactory. Most of these, however, were produced in the early days of the Museum, and under circumstances which made their acceptance and exhibition quite unavoidable. The Director is fully alive to this fact, and it will not be long before all such undesirables pass from view. On the whole the exhibits are quite high-class, and speak volumes for the energy and resolution which have evolved so fine a collection from such small beginnings and in so short a space of time. The writer would much like to see something further done in the direction of displaying local specimens amongst their natural surroundings, and thus showing something of their life history at a glance. A collection of the snakes of the Transvaal exhibited as mounted specimens would also be of much interest, the institution having a very excellent collection of reptilia in preserving jars.

At the further end of No. 6 hall a door opens into a small herbarium. The keeper, a Dutch lady of considerable scientific attainments, has been engaged in working out the flora of the country as it is represented in the vicinity of Pretoria. On the shelves are series of boxes containing carefully-mounted specimens arranged in sequence of families, and all methodically catalogued. The fruit is also shown, as well as sections of wood, and photographs of the plants themselves.

At the far side of the rectangle opposite the entrance hall is a well-fitted but rather badly-ventilated photographic dark room, and the laboratory of the chief taxidermist and his assistant. There are in addition two rooms upstairs, where duplicate skins are stored, and also the reptilia collection in spirits. On the covered verandah outside the dark room and laboratory are some old cannon, the history of some of these being of the greatest interest. The two principal ones are "Ou Grietje," and a wagon-tyre cannon. The former of these is indeed a fearfully and wonderfully made weapon. It is mounted on the after-guides of a buck-wagon. The cannon itself is only 20 in. in length from the touch-hole to the muzzle-rim, and the calibre at the muzzle is $3\frac{1}{4}$ in. The origin of its name "Ou Grietje" is somewhat obscure, and such information as is possessed upon the subject is "tabu" in a public work of this nature. The wagon-tyre cannon is a weapon that was used by the Boers in 1881. It is made of successive layers of tyre-iron welded together. It is related that when Lord Roberts examined this curious engine of war he remarked that he scarcely knew which to admire most, the inventive genius of the man who constructed it, or the pluck of the one who fired it. There is an old French mitrailleuse and other old cannon dismantled, on view, in addition to the above.

THE OLD FORT, POTCHEFSTROOM.



PRETORIA AND JOHANNESBURG,

AND THE

COUNTRY TOWNS OF THE TRANSVAAL,

INCLUDING THE PROFESSIONS,

MANY OF THE PRINCIPAL COMMERCIAL HOUSES,

AND INDUSTRIES.

PANORAMIC VIEW OF PRETORIA.

Pretoria.

THE pleasantly-situated capital of the Transvaal is apt to be regarded as a kind of sleepy hollow, yet it has been the scene of many stirring historical events and the home of numerous deep-laid political and financial intrigues. So little did the past associations of Pretoria commend themselves to British colonists in the Transvaal, on the conclusion of the 1899-1902 war, that it was considered its position as capital of the Colony might be usurped by Johannesburg. Wiser counsels, however, prevailed, and Mr. Chamberlain's emphatic declaration, on the occasion of his visit to the Transvaal in 1903, that "Pretoria is the capital, has been the capital, and always will be the capital," gave satisfaction to many besides those who were resident in the historic city. This confidence in the ancient capital, that it would prove deserving of the honour of being the Government centre of the newer Transvaal, has not been misplaced. Pretoria has made great strides during the past few years. The new and handsome buildings erected, and the rapidly increasing extent of its beautiful suburban resorts, are sufficient proof of its popularity as a residential town. This is as it should be, and is in pleasant contrast, as something quieter, less aggressive, and more dignified, to the jangling rush of the "Golden City," its everlasting financial scheming, and its absolute abandonment to the acquisition of riches. It is amusing, in connection with the indignation expressed throughout the country by the Boer community at the mere suggestion of the abolition of Pretoria's privileges, to recall the reluctance with which the town was admitted to its present position by the earlier inhabitants of the Transvaal. The township was laid out by Mr. Martinus Wessels Pretorius, son of the *voortrekker* of that name, and first President of the united Boer republics—under the title of "South African Republic." The site selected was on a farm belonging to Mr. Pre-

THE MAIN BUSINESS THOROUGHFARE OF THE CAPITAL (CHURCH-STREET).

Church-street, Pretoria, showing the Old Dutch Reformed Church (now removed).

torius, offered by him as a suitable spot for the capital of the newly-formed State—Potchefstroom, the then seat of administration, not being in a sufficiently central position for the convenience of the eastern and northern districts. The offer was accepted, and the newer capital was named after its founder. So firmly had the administration become established in the old capital, however, through long custom and official influence, that only by the exercise of a *coup d'état* (according to contemporary chronologists) did the President succeed in bringing about the desired change. By his orders, the Government printing plant—then the only one in the country—and the Government records and documents, were secretly impounded and borne off from Potchefstroom at night by ox-wagon. Pretoria was laid out in 1857. It has an altitude of 4,471 ft. above sea level, and a population of 36,700 of all nationalities. Outside Government and official circles, the majority of the inhabitants are Dutch. Pretoria is situated among picturesque hills, on the northern slope of the Wit-

GOVERNMENT BUILDINGS, PRETORIA.

watersrand Range. It stands on the Aapies River—a tributary of the Crocodile River—which flows through the town and is spanned by two picturesque bridges. This river, which rises dangerously in flood during the wet season, adds an undeniable attraction to the town. There are water shuts on either side of most of the principal streets running in well-made channels, some open and others covered. The water supply is pure and practically inexhaustible. The public parks and gardens of Pretoria are well planted with trees, which grow luxuriantly, together with flowers of all kinds, roses especially blossoming in great profusion. Many of the streets are lined with fine willow trees, which were originally put in for no more ornamental purpose than that of fencing poles! The town is dominated and protected by hills, and where the Johannesburg railway line approaches the confines of the city these hills are crowned with a succession of frowning forts, of little real utility, notwithstanding their magnificent strategical position. Since the British occupation these have been in a great measure dismantled. In spite of the wealth of water and foliage, wide streets, fine buildings, and pretty suburbs, Pretoria presents a somewhat dusty and unkempt appearance, and retains a countrified, unbusiness-like air strangely at variance with the importance of enactments taking place within its boundaries. It may be of interest to recall a few of the many events of historical interest transacted in the town subsequent to the arrival of the ox-wagon with its load of governmental paraphernalia. The formal annexation to the British dominions of "the territories north of the Vaal" by Sir Theophilus Shepstone in 1877; the unsuccessful siege of Pretoria by Boer commandos, and the gallant defence of the little British garrison, during the war of 1880-1; the subsequent solemn burial of the British flag, kept flying with so much devotion by the loyalists; the signing of the Pretoria Convention which restored the country to the Boers; all these belong to the older times. Later, scene after scene of ignoble intrigue culminated in the disastrous Jameson Raid, and the ignominious entry into the capital of Dr. Jameson and his troopers as prisoners. Another batch of prisoners, the so-called "Reformers" of the Rand, followed, and the precincts of Pretoria Gaol witnessed many peculiar transactions during the next few weeks. Then came the sensational trial of Dr. Jameson, with the carefully-contrived death sentence; the trial of the Reformers and their release; and, two years later, the release of the two gallant prisoners who refused to sue for the President's clemency. In October, 1899, the ultimatum which was to "stagger humanity" was launched at Great Britain from Pretoria, and this was followed by the departure of the British Resident, and the greater portion of the British population. After a few months the stubborn author of all the trouble abandoned his stronghold, and incidentally his wife, to the mercy

THE PALACE OF JUSTICE, FACING CHURCH SQUARE, PRETORIA.

of the invading forces, fleeing eastwards in a luxurious saloon carriage which contained his administration: and on June 5th, 1900, Lord Roberts, at the head of the largest British force ever put into the field, entered the capital of the Transvaal, which surrendered without an attempt at defence. Many hours of desultory fighting had taken place at Six Mile Spruit, outside the city, on the Johannesburg-Pretoria road, but the vaunted forts encompassing the entrance to the town failed abjectly in their purpose; in the small hours of the morning Pretoria signified her willingness to surrender. Two years later (May 31st, 1902) peace became assured in South Africa by the general terms of surrender which were signed by Lord Kitchener and the Boer delegates from the Vereeniging Conference, at the residence of the Director of Military Intelligence near Burger's Park. On the following Sunday an enormous concourse of people from all parts of the Transvaal assembled to attend a solemn service of thanksgiving for peace, held on Church Square, which was graced by the presence of Lord Kitchener and his staff, a large number of troops, and some 5,000 Boer "National Scouts" in full marching order. A fine rendering of Kipling's "Recessional" hymn was an impressive feature of the service. The Coronation celebrations, the visit of Mr. Chamberlain, the visit of H. R. H. Princess Christian and her daughter (the first members of the Royal Family to visit the Transvaal), and the subsequent visits of Lord Roberts and H. R. H. the Duke of Connaught, were all noteworthy events, but the most impressive ceremony held in Pretoria since the thanksgiving service was the funeral of the ex-President, Paul Kruger, whose body had been conveyed from Europe, with full ceremonial. Followed by an immense throng of Cape Colony, Free State, and Transvaal Boers, along streets packed with spectators—perfect order being maintained by the police force and the troops of the victorious army—the solemn procession passed through the town, including in its ranks friend and foe, follower and opponent of the deceased patriot. Besides numerous Dutch colonists who held leading positions in various parts of South Africa, there were included in the *cortége* most of the high officials of the British administration, foreign representatives, and delegates from nearly every civil and social body and organisation in the Transvaal.

NEW GOVERNMENT BUILDINGS, PRETORIA.

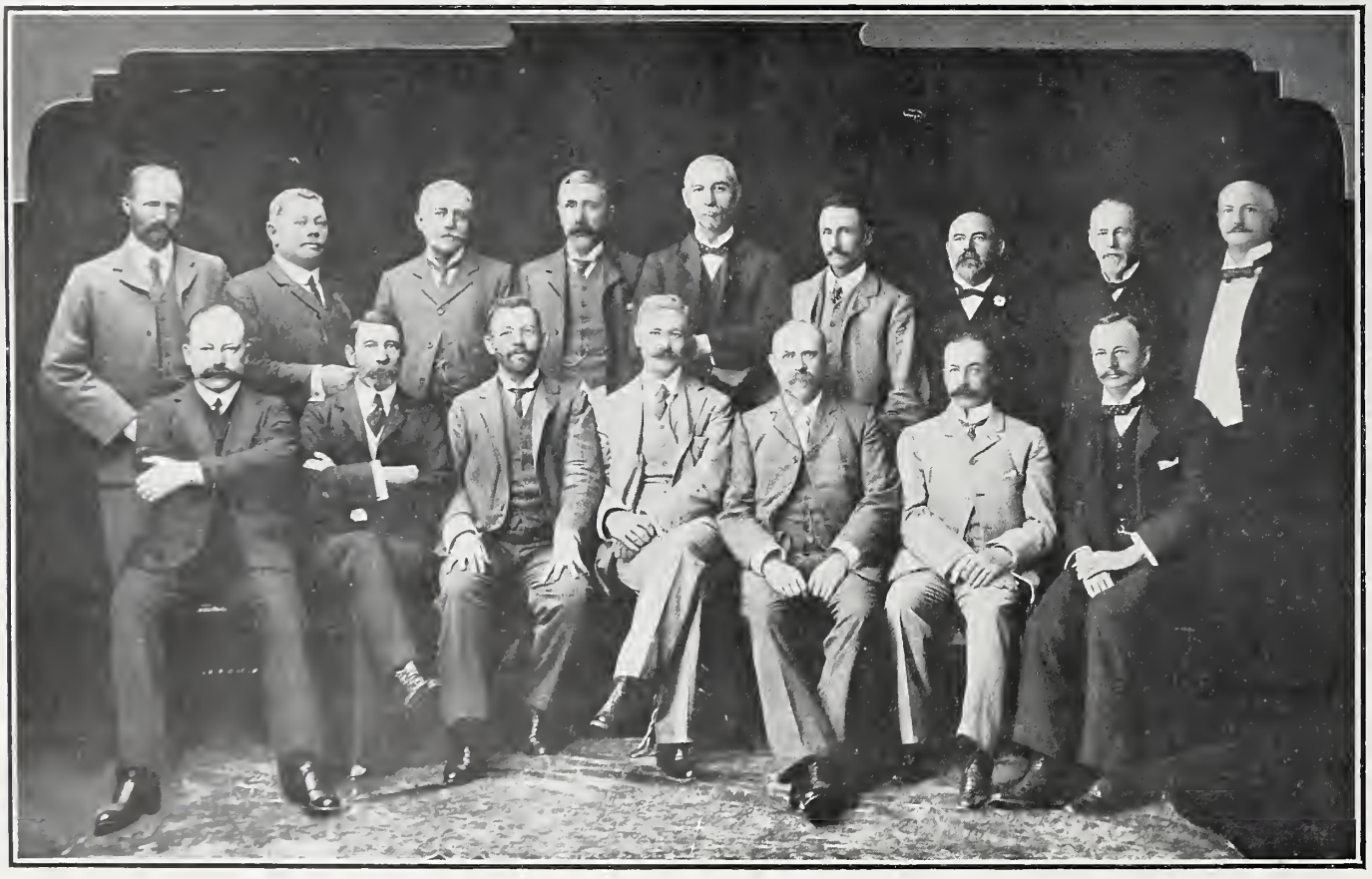
The climate of the capital city is mild and moist. The relaxing nature of the heat is very trying at first to British residents; nevertheless, the health of the town is good, and compares favourably with that of other towns in the Transvaal.

The public buildings of Pretoria are a source of pride to the residents. They are by far the finest in South Africa, and for this reason alone, if for no other, it would have been undesirable to place the seat of administration in any other town in the Transvaal. The fine block of Government Buildings on Church Square was erected from designs by Mr. Wierda, Government architect, in 1892, to accommodate the "Raadzaals" of the Republic. They are now used for meetings of the Legislative and Executive Councils of the Transvaal Colony, and in addition contain commodious suites of offices occupied by the more important of the administrative departments. Among these may be mentioned the offices of the Colonial and Assistant Colonial Secretaries, and Public Works Department. This building stands upon the site of the insignificant thatched

cottage which was considered sufficient for parliamentary purposes before the influx of wealth from the Witwatersrand, and a sum of some £200,000 was spent upon the later structures, at a period when uitlander gold was easily acquired, and lavish expenditure on public and private needs was the order of the day among Boer Government officials. A supplementary building, also of imposing proportions, stands somewhat further back from the Square, wherein the Surveyor-General's and other public offices are located. Facing Government Buildings, across the Square, is the handsome Palace of Justice, with a stately central hall, and lesser halls to accommodate the sessions of the Supreme Court, all handsomely decorated in marble and polished brass. The central position in Church Square was formerly occupied by the old Dutch Reformed Church, erected by the *voortrekkers*, as was their wont, on the best site in the township. Round it, in the Square, hundreds of Boers, with their tents and wagons, used to congregate periodically for the *Nachtmaal* service. The Square is now Government property, by purchase, and on the completion of the new Dutch Reformed Church in Vermeulen-street the old building was pulled down. This took place just before the funeral of the late Mr. Kruger. It is the intention of the Government to lay out the Square in ornamental style. The pedestal erected in Church Square to receive the statue of Paul Kruger, presented to the town by Mr. "Sammy" Marks (under the old *régime*), has also been removed, and statue and pedestal have been accorded a site in the park near the cemeteries. An ornamental fountain now occupies the site of the old Dutch Church. The post and telegraph offices, also situated on Church Square, are quite inadequate to meet the demands of the larger business development of Pretoria, and will be superseded by more spacious and convenient premises. The principal banking companies of South Africa have offices on Church Square — the National Bank of South Africa, the Bank of Africa, the Standard Bank, the Natal Bank, the Netherlands Bank, and the African Banking Corporation. The Grand Hotel, with premises abutting on Church Square, the Transvaal Hotel, in close proximity, and the Eaton Hall Hotel, are among the best hotels in the capital. Church-street, running east and west from Church Square, has its western extremity in the Market Square, where new market buildings have been erected. The amount expended on these was about £35,000. The Transvaal Museum collection was formerly accommodated in the old Market Hall. The old Presidency, the home of the Kruger family, is situated at the other end of Church-street, opposite the Dopper Church, in which the family worshipped, and where the late President occasionally preached. The Anglican Church, acting as the pro-Cathedral, and dedicated to St. Alban, is a somewhat insignificant building. The Presbyterian and the Wesleyan Church buildings are substantial structures, while the Jewish Synagogue is an edifice of really handsome design. There is a native Church with a large congregation. The educational advantages of Pretoria are distinctly good, some of the best equipped and most successful of the Transvaal schools, especially those under Government control, being located in the city. There is a Normal College for the training of teachers; and at Irene, a suburb on the railway line to Johannesburg, where the concentration camp was situated during the war, is an excellently administered orphanage under Government control. Church-street East, which contains the principal business premises of the town, crosses the Aapies River. Beyond the river are situated the principal residential suburbs—Sunnyside, Fairview, Arcadia, Brooklyn, and Bryntirion. The last-mentioned is Government property, and has been laid out for official residences for the members of the Government Executive. The Transvaal Government House is situated in this suburb. The style chosen for the building is that of the old Cape Dutch farmhouse. The Boys' High School, the first school to be opened in the Transvaal under British administration, and the Girls' High School each have a large attendance, and first-class tuition is given at both. The Roman Catholics support a large and successful convent school, and there are several independent scholastic institutions, both British and Dutch, where children receive a sound education on modern lines. One of these, known as the Diocesan College, is under the control of the Anglican Church. The Pretoria Hospital, greatly enlarged since the war, was founded by President Paul Kruger in 1890. It is a Government institution, standing in pleasant, well-kept grounds. The charges are 5s. per day for public wards and 10s. per day for private wards, there being a separate section for the accommodation of coloured persons. About seven miles from the town, at West Fort, is the Pretoria Leper Asylum, where every effort is made to alleviate the melancholy life of the unfortunate inmates. The coloured cases number more than double those of Europeans. The two classes have entirely separate accommodation, and families are

PREMISES OF THE NATIONAL BANK, PRETORIA.

allowed to reside together. With the exception of that on Robben Island, off the Cape Peninsula, this is the only leper hospital in South Africa. Pretoria has a good public library, with a collection of maps, and works of reference, including a large number dealing with South Africa. The Zoological Gardens, which receives a grant-in-aid from Government, and are under the same management as the Museum, are an attractive institution in Pretoria, where most species of South African animals and birds are represented. The grounds are beautifully laid out. On Sunday afternoons and Wednesday evenings a band performs, and constitutes an additional attraction to the public. The property of the Zoological Gardens embraces an area of about 64 acres. All this space, however, is not yet utilised. The Gardens form a botanical as well as a zoological department. Lions have been included in the collection. Prior to the war, President Kruger declined to admit the king of beasts, owing to foolish reports which gained credence at the time that a lion presented to the Gardens by Mr. Rhodes was sent as an emblem of British power. The animal, a fine young South African lioness, was declined with scant courtesy. An average of 18,000 persons per month visit the Gardens. The nucleus of the zoological collection was first kept in the yard behind the old Market Hall. The Pretoria Museum aims at forming a complete collection of South African fauna and flora, and also all possible objects connected with the ethnography and history of the sub-continent. The Government Printing Works, the Magistrates' Court, and the Police Station, are all contained in good buildings. On high ground outside the town, known as Roberts's Heights, is situated the residence of the Commander-in-Chief, in close proximity to the military cantonments. Opposite Burger's Park is a handsome house built by Mr. Hollard, a citizen who played a prominent part in the former history of Pretoria, and on more than one occasion assisted the almost bankrupt Boer Government to tide over a crisis by an opportune loan. This house was used as military headquarters by Lord Roberts and Lord Kitchener during the campaign of 1899–1902. Near the foot of Signal Hill, a lofty summit overtopping the town, stands the cottage where lived "Jess," the heroine of Rider Haggard's popular novel. The Central South African Railway station and the locomotive workshops are situated below this hill, on the site once occupied by the laager in which British women and children were sheltered during the siege of Pretoria in 1880. Away to the left the Artillery Barracks, built for the "Staats Artillerie"—the standing army of the South African Republic—are situated. The old prison, near by, still stands, a silent witness to many an infamy. A new Central Prison has been erected, the old structure being inadequate and insanitary, with a wall enclosing it that scarcely shut



MEMBERS OF THE PRETORIA TOWN COUNCIL, 1906.

(Back Row—Standing)

F. Turner. E. P. A. Meintjes. C. H. Barrett. J. J. Kirkness, J. Dougall, C. M. de Vries, J. S. Cowie, T. W. Beckett, John S. van Reesema (*Town Clerk*).

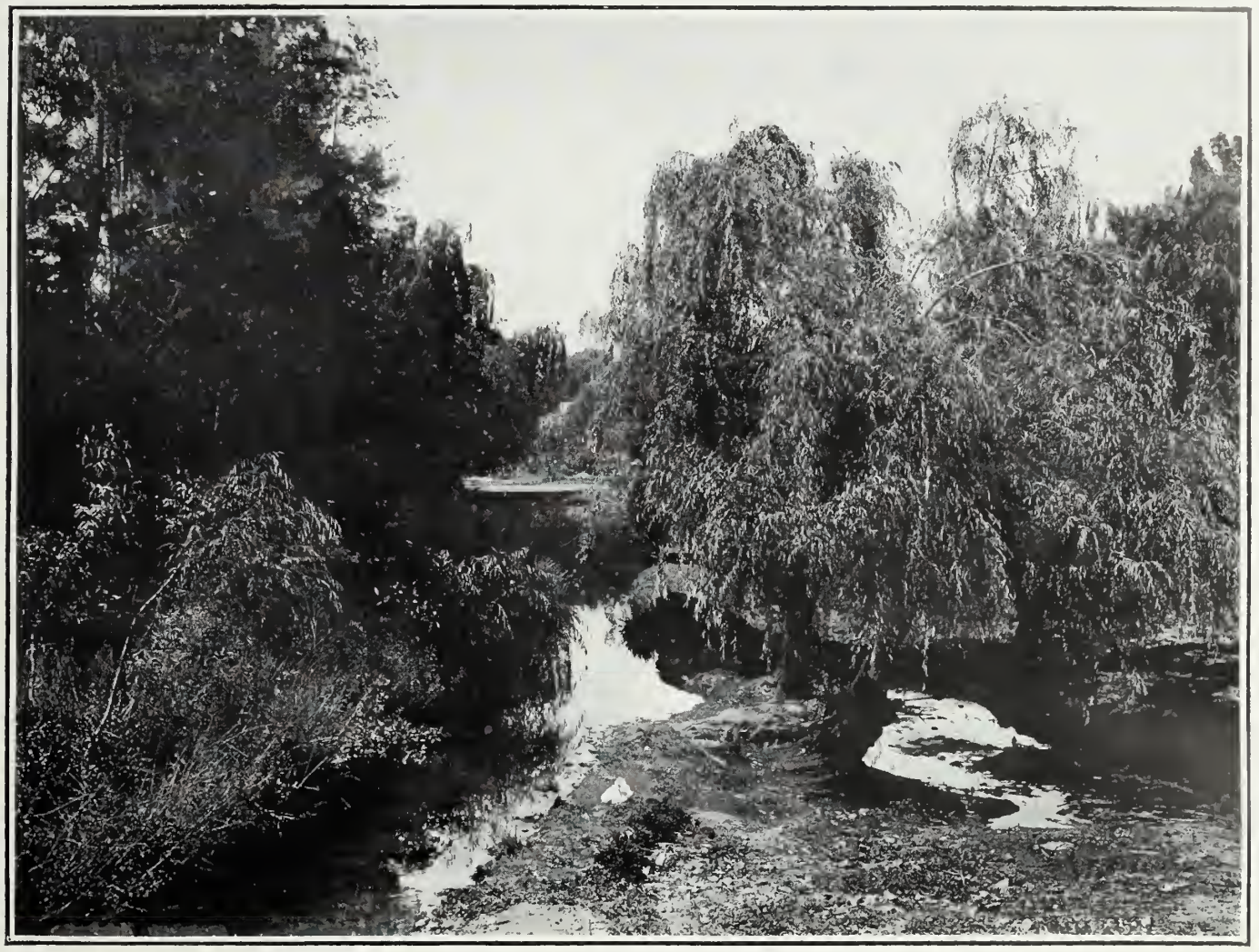
(Front Row—Sitting)

E. Chappell, M.C.L. R. K. Loveday, M.C.L. E. F. Bourke, M.C.L. J. G. van Boeschoten (*Mayor*). A. Johnston, E. G. Heather, H. C. Jorissen.

out the public from the sight of executions. There are many pretty drives in the vicinity of Pretoria. Favourite excursions may be made to

great deal of commercial prosperity in Pretoria, and much pleasant social life. The official element is large, and on good terms with the population. The

Mr. Johannes Gerard van Boeschoten (1905–6). As showing the progress of building operations during one year since the war, October, 1904, to Sep-



VIEW IN ARCADIA, PRETORIA.

the source of the Aapies River, known as "The Fountains," and to the "Wonderboom," an enormous tree of the wild fig species, which spreads from one stem over an area that can shelter upwards of 500 people. It is the only tree of this kind to be found in the district. The country in the neighbourhood of Pretoria is highly mineralised. Gold, cinnabar, and coal have been discovered, and here also is the Premier diamond mine, which commenced work in 1903, and has already won a place in the front rank of diamond-producing propositions. The mine has produced in its output the largest diamond in the world, and its workings are considered to be the richest diamond workings ever operated. Sixty per cent. of its profits go to the Government exchequer. There is a

wheels of life revolve with less clatter in the capital than on the Witwatersrand, and there is an absence of ostentation and simplicity of style in Pretoria society which makes the city an eminently desirable residential spot.

Various forms of municipal rule have been exploited in the Transvaal capital. A temporary and provisional Town Council was appointed during the war, on November 17th, 1900; a nominated Town Council was elected on the 7th February, 1902; a Municipal Commission was appointed in May, 1903; an Elective Town Council was constituted on the 28th November, 1903. The Mayors of the town have been:—Mr. E. F. Bourke (1903–4), Mr. A. Johnston (1904–5),

tember, 1905, it may be stated that 390 plans of structures, of an estimated cost of £327,244, were passed. These plans represented 521 new buildings, alterations, or additions, estimated to accommodate 1,161 persons. During the period January to September, 1905, the number of plans passed was 309, representing buildings and alterations of an estimated cost of £257,151. Contemplated schemes under consideration by the Town Council of Pretoria at the period of writing included the following:—

Electric lighting extension (£35,000), water supply extension (£125,000), surface drainage scheme (£175,000), sewerage scheme (£175,000), tramway improvements (£200,000), bridges, refuse destructor, etc. (£70,000).

THE CHAMBER OF COMMERCE.

The Pretoria Chamber of Commerce (Incorporated) was established on the 24th August, 1891, for the purpose of assisting to promote and protect the general mercantile interests of the Transvaal, and to obtain the removal, as far as possible, of all acknowledged grievances affecting the commercial community. Several of the prominent members have been associated with the Chamber ever since its establishment. The Committee for the year 1905 were:—President, Mr. E. F. Bourke; vice-presidents, Mr. A. Johnston, Mr. T. W. Beckett: members of Committee, Messrs. E. Chappell, R. C. Francis, Robt. Hamilton, W. Millar, A. T. W. Downie, E. Lilienfeld, I. Haarhoff, T. J. Rodda, R. E. Lunt, and W. J. Foot. The secretaries are the Bourke Trust and Estate Company, Ltd.

THE MAYOR OF PRETORIA.

Mr. J. G. van Boeschoten, elected Mayor of Pretoria in November, 1905, was the first Dutch Mayor of the capital of the Transvaal. Under the Government of the South African Republic, Pretoria was not even granted the modicum of municipal authority possessed by the "Staatsraad" of Johannesburg, and the town only received local governing powers subsequent to the war. As in Johannesburg, Councillors of the Pretoria municipality are elected for a term of three years, and it was during the third year of his service that Mr. van Boeschoten was chosen as Mayor of the city. Mr. van Boeschoten was born in 1862, and is the son of Mr. Henricus van Boeschoten, one of the earliest settlers in the Transvaal, who made his home in the Pretoria district. He was educated at Pretoria, and, on electing to take up the law as his profession, distinguished himself in his matriculation and law examinations. Having served his articles, he was admitted to practice in 1884, and settled on the Rand in the pioneer days. In 1887 he became solicitor to the Sanitary Board of Johannesburg, so that it may be said that his experience of municipal affairs extends over many years and embraces many and varied conditions. Mr. van Boeschoten married, in 1893, the daughter of the late Mr. Thomas David, of Liverpool, England. The Mayor of Pretoria is of the Moderate party in politics, and stood as an Independent candidate at the municipal elections. He was the only Independent who was successful on that occasion, and was returned at the head of the poll. He was placed in the civic chair by the unanimous vote of the Council.

BURGER'S PARK, PRETORIA.

Mr. E. F. BOURKE.

Mr. Edmund Francis Bourke, M.L.C., of "Barton Keep," Pretoria, is the eldest son of John Bourke, one of the early colonists of Natal. He was educated at private schools, and at Maritzburg High School. He received his business training in Natal, and went to the Transvaal early in 1877—before British annexation. He returned to Natal for a short time in 1878, and settled finally in Pretoria in 1897. Immediately taking an interest in municipal affairs, he was elected a member of the first Pretoria Municipality. This election was cancelled upon the retrocession of the Transvaal in 1881. In spite of taking an active part in the mercantile business of Bourke & Co., and other commercial undertakings, and of being an active director on the Board of the National Bank prior to the war, he devoted himself with great energy and spirit to many public and philanthropic institutions. Before the occupation of the country by the British he interested himself very largely in the hospitals and nursing homes, where his administrative and business abilities were of the utmost value. During some months of the last war he served as Acting Burgomaster of Pretoria under Gen. Sir J. G. Maxwell, and was appointed to a seat in the Legislative Council of the Transvaal on the cessation of hostilities. He is Chairman of the Pretoria Chamber of Commerce, President of the Irish Association of Pretoria, Chairman of the Bourke Trust and Estate Company, Limited, and of several mercantile concerns. He was elected Mayor of Pretoria at the end of 1903.

Mr. Bourke has also been associated prominently with all athletic sports. It was mainly through his efforts that the visits of the English professionals, Brockwell, Trott, and Braund, to Pretoria took place. Mr. Bourke married on May 18th, 1881, Eleanor, third daughter of Henry Griffin, of "Woodford," Maritzburg, Natal.

THE "WONDERBOOM," NEAR PRETORIA.

Messrs. MOSENTHAL BROS., LTD.

Among the mercantile houses of the capital that have considerably contributed towards its commercial importance and prosperity is that of Messrs. Mosenthal Bros., Ltd. This firm's record is one of continuous progress and advancement. The business, which is entirely that of wholesale merchants, has its head South African quarters at East London, with branches at Port Elizabeth, Kimberley, and Johannesburg, all of extensive proportions. The Pretoria

business was established in 1888. Accompanying illustrations show the handsome premises in Church-street, which cover 440 ft. by 117 ft. A collection of merchandise of every description is here stored, including provisions, hardware, building material, and soft goods, in every case obtained from the best sources of production, sound judgment and long experience of the South African markets having been brought to bear in their selection. Special attention is devoted to the building material and the Boer and Kafir trade branches of the business, and operations in both these departments are on an extensive scale. The resources and capital of the firm ensure a command of the best markets; purchasing, as Messrs. Mosenthal do, in enormous quantities, they are in a position to offer exceptional advantages to their clients, and consequently they have become the largest wholesale merchants in South Africa. The mercantile status of this business is of the highest character. The managers for Messrs. Mosenthal Bros., Ltd., Pretoria, are Mr. Ernest Chappell and Mr. C. Hoepner.

PREMISES OF MESSRS. MOSENTHAL BROS., LTD., CHURCH-STREET, PRETORIA.

Messrs. J. C. Muiry & Company.

The firm of Messrs. J. C. Muiry & Company, who have a high-class drapery and millinery establishment in Pretoria, may be taken to represent all that is best in their line in town. The phenomenal success of this business, which has been started during a long continued period of financial and trade depression, speaks volumes for the splendid capabilities of its head. That Messrs. Muiry & Co. have the right goods to sell, and that they are selling them, must be quite evident to their already numerous and still rapidly increasing *clientèle* who daily throng the various departments. Everything that money and brains can do for an attractive display of tempting goods has been done by this go-ahead and enterprising young firm. Their whole establishment gives a decided impression of excellent taste, business-like management, and it is evident that their first object is to please their customers. The fittings and showcases of this store at once strike one as being particularly handsome, convenient, and well calculated to set off to best advantage a magnificent show of high-class goods and novelties representing a wide choice from all the European markets. Style and quality are *en evidence* all along their busy counters—loaded with the latest creations of Paris and London—together with a really fine selection of goods for everyday wants. It is an encouraging and a distinctly hopeful sign to find that up-to-dateness and pushful energy can still command success in spite of chronic complaints all round about bad times in the Transvaal. To use an Americanism, "Get on—or get off" seems to be the business motto of Messrs. Muiry & Co. It is perfectly evident that they mean to limit themselves to the "getting on" part of it, and that they are assured of success is the dominant tone from top to bottom of Messrs. Muiry & Co.'s establishment.

MESSRS. J. C. MUIRY & CO., PRETORIA.

Drapery Department. Show Rooms. Exterior of Premises.

Messrs. T. W. BECKETT & CO., LTD.

The widely-known firm of Messrs. T. W. Beckett & Co., Ltd., was founded in Pretoria by Mr. T. W. Beckett in the early part of 1875, when President Burgers was the official head of the Transvaal Republic. The premises in which the start was made were situated in the present Church Square—then termed Market Square—and were of little more than cottage extent. However, with the passing of the years the firm developed gradually into the largest establishment of its kind in the Transvaal. Mr. Beckett, who was only 23 years of age when he founded his business, bought the stand now occupied by the Company's headquarters in 1876, and it is interesting to know that he paid £175 for it—a price at that time looked upon as an exorbitant figure. The firm has lived through the 1887 annexation, the 1880-81 Anglo-Boer War and subsequent retrocession, the Jameson Raid, the re-annexation by Great Britain, and no fewer than nine Kafir wars which have at different periods disturbed the country. The business was converted into a limited liability company in 1891, the partners in that year included Mr. John Paddon and Mr. James Hill (who was an ex-member of the Legislative Assembly of Cape Colony). In the course of time Mr. Hill retired, and Mr. Paddon died, and since the war of 1899-1902 shares of the late Mr. John Paddon have been acquired by the Beckett family. Mr. T. W. Beckett continues as managing director of the Company, loyally assisted by the other directors—his son Mr. George Beckett, and Mr. Frank Strange. There are several other branches; one large one in Johannesburg (under the same style and title), one in Pietersburg (the "Pietersburg Stores"), one at Vereeniging, a fourth in Rustenburg (John Somers & Co.); and in Pretoria there are also branches trading under the titles of the Transvaal Bottling Company, Izaak Haarhoff & Co., and the Ready-money Outfitting Company. As has been indicated, Messrs. T. W. Beckett & Co. have been in business for the long period of 31 years, and their trade extends over the whole of the Transvaal, and embraces the large handling of the products of the farming community. They are direct importers on an extensive scale. Mr. Beckett is himself by birth an Englishman. He passed his boyhood's years in Castlemaine, Victoria, Australia, migrating with his parents to South Africa when 14 years of age. The family arrived

BUSINESS PREMISES OF MESSRS. T. W. BECKETT & CO., LTD., PRETORIA.

MR. T. W. BECKETT (Pretoria).

in the country in November, 1864. Mr. Beckett has resided in South Africa ever since, with the exception of three visits to Europe at different times. He has identified himself with the public life of Pretoria, and takes a keen interest in the affairs of the community. He was the first Chairman of the National Bank of South Africa, and held that position for eleven years. Then, at the termination of the last war, the Board was re-constructed. Mr. Beckett has frequently given advice in political matters, but never took a prominent part in public life until 1904, when he became a member of the Pretoria Town Council. He is a J.P. of the district, is a foundation member of the Transvaal Lodge of Freemasons, and a Director of the Zoological Gardens and the Transvaal Museum. Messrs. Beckett & Co.'s headquarter premises, where 125 whites and 85 Kafirs are employed, cover an area of approximately 108,000 square feet. They were Government contractors to the late South African Republic. T. W. Beckett & Co., Ltd., hold large farming interests. As an instance of the foresight and enterprise of the principal, it may be stated that the firm has been established in Pietersburg since that town was founded, and that it has had a branch at Rustenburg for the last 25 years. Messrs. Beckett, Son & Morton, of Suffolk House, Laurence Pountney Hill, Cannon-street, London, are the home buyers—Mr. Morton being in charge of the buying, and Mr. Percy Beckett the finance department. Of this firm Mr. T. W. Beckett is also a partner. To conclude this review, it should be added that Mr. Frank Strange, who superintends the finance department at Pretoria, has been with the firm under notice for 23 years, during which time he has rendered loyal service. He also hails from England.

THE READY-MONEY OUTFITTING COMPANY.

This firm, whose premises occupy one of the finest positions in the main street of the capital, is one of Pretoria's old landmarks, which with the progress of the town are gradually being obliterated and new premises replacing them. The shop is situated at the corner of Church-street and St. Andries-street. The business conducted is that of general outfitters and tailors. It is a branch business of the well-known firm of Messrs. T. W. Beckett & Co., Ltd. It was established in 1886, and although outwardly the premises have a very time-worn appearance, the goods kept are of a class equal to any that may be sold in the more imposing and modern buildings. In former years this business occupied the unique position of being the only establishment that confined its operations to outfitting and tailoring. It is thriving, and does a large trade with the Dutch community and also with the middle-class inhabitants of the town. The tailoring branch extends its operations all over the Transvaal, and finds much favour among its numerous patrons.

MESSRS. CURTIS AND COMPANY.

Amongst the pioneer retail business houses on the Rand that of Messrs. Curtis and Co. is certainly entitled to a place in the foremost rank, for this firm started business in Johannesburg early in 1887, when the future city was only a mining camp. In those days the only means of communication was by coach and ox-wagon, the nearest forwarding points being Kimberley in the Cape Colony, and Ladysmith in Natal. All goods came up by wagon, and were often months on the way, delayed by bad roads and swollen rivers.

The firm's initial effort was made in premises next to the Central Hotel, Johannesburg, and opposite to what is now the Standard Bank, which part,

Showroom.

Drapery Department.

MESSRS.
T. W. BECKETT & CO., LTD.,
PRETORIA.

in those days, was the business centre of the town. Twelve months later the firm opened other premises higher up in Commissioner-street, opposite the Rand Club, and, the town extending rapidly in this direction, the new branch soon developed into a large and flourishing business.

Shortly after the war, the firm, seeking a further outlet for their energies, decided on opening in Pretoria. After some delay, one of the smartest and most up-to-date outfitting establishments in the sub-continent was opened in March, 1904. The style, finish, and fittings of the premises, and the quality and taste of the stock displayed, are quite worthy of Bond-street. Soon after opening, the firm were appointed "hosiers and outfitters" to his Excellency Sir Arthur Lawley, K.C.M.G., etc., late Lieut.-Governor of the Transvaal. The enterprise of Messrs. Curtis and Co. has been fully appreciated by the public of Pretoria and district generally, and has met with most gratifying results. This is amply testified by the large and flourishing business that is now being carried on by the firm.

PREMISES OF MESSRS. CURTIS & CO., PRETORIA.

The London buying department is in the hands of Mr. F. H. Curtis, while the Pretoria branch is supervised by Mr. C. G. Curtis. Mr. C. H. Beart is the resident partner in Johannesburg.

THE GRAND HOTEL.

The capital city of the Transvaal may reasonably boast of several very fine hotels. As a rule there is generally one house in a town which takes the lead, and the credit in that direction in Pretoria may be given to the Grand. This is situated in Market-street, opposite the Government Buildings and Palace of Justice. The accommodation it affords its patrons is in every way excellent. The building was erected in 1893 by Mrs. Lys, and is now the property of the Pretoria Estates, Ltd. Under the lesseeship of Mr. S. Schlomer, it has attained its present premier position. The appointments are everything that skill and good taste can make them. The entrance hall is very nicely draped. To the right is

SHOWROOMS OF MESSRS. CURTIS & CO., PRETORIA.

the office, and on the left is a well-appointed lounge, off of which the private bar is situated. A corridor leads through to the dining hall, a really magnificent apartment, capable of seating over 200 guests. There is also a smaller dining-room used for private suppers and banquets. Before leaving the description of so important a feature as the dining hall, reference must be made to the catering. Everything of the best is provided, including delicacies which are not usually met with in other hotels in South Africa; while the wine list is furnished with an excellent selection of vintage wines as well as the best of the colonial product. There are the usual complement of reception rooms, writing and smoking rooms, and bedrooms in the hotel capable of accommodating 79 visitors. Thirty white servants and 23 coloured attendants are employed on the staff. The hotel is frequented by the best class of people visiting Pretoria.

ENTRANCE HALL OF THE GRAND HOTEL, PRETORIA.

MESSRS. I. J. HAARHOFF & CO.

When after the Occupation the Government of the Transvaal decided to re-start and re-organise agriculture under military control, the O.C. of that department, in making inquiries as to who to consult on the matter, was generally referred to Messrs. I. J. Haarhoff & Co., of Pretoria, who take a keener interest in this particular line to-day than possibly anyone else in South Africa. This firm is a branch of the extensive business of Messrs. T. W. Beckett & Co., Ltd. After peace was declared, Messrs. Haarhoff & Co., to show their practical belief in agriculture, decided to show their faith in it by re-organising their business, entirely in the interests of the farmer, and to supply the most up-to-date agricultural and hydraulic machinery. Proof of

THE GRAND HOTEL, PRETORIA.

this is to be seen when one enters the stores of the firm. There may be found at all times one of the very largest assorted stocks in this class of business in South Africa. The firm has backed its opinion of the capabilities of the agricultural industries by taking up the sole agencies of the most celebrated houses in England, Sweden, Switzerland, and America (which country is well represented). The following is a partial list of the firms represented by Messrs. I. J. Haarhoff & Co.:—Tangyes, Ltd., pump and oil engines; Ransomes, Sims & Jefferies, ploughs, threshing outfits, and steam engines; Field's cattle oils; Roderick Lean Manufacturing Co., harrows; Lansing Wheelbarrow Co., wheelbarrows; Orma's Incubator and Brooder Company; David Bradley Manufacturing Co., disc ploughs and hay presses, gang and walking ploughs, and planters; Rife hydraulic engine; Foos Manufacturing Company, mills and forges; Harder Co., tread horse powers; Silver Manufacturing Co., cutters and shredders; Vipan & Headly, dairy utensils; Bickfors & Huffmans, grain drills; Keystone Manufacturing Company, huskers and shredders; Electrical Union, electrical motors, &c.; Litchfield Manufacturing Co., horse gear grinders; Acme Harvester Co., reapers and binders, mowers and hay rakes; A. Buehs Sons, sawing machines; W. Smith Grubber Co., grubbers for cleaning virgin land; The A. W. Straub Co., hand mills; Sandwich Manufacturing Co., hand mealie-shellers; U.S. Wind Engine Co., wind and gear engines, with graphite bearings; F. E. Myers & Bro., pumps; Huron Co., traction engines; Sharples cream tubular separators; Dempster, well-drilling plant; FitzWater Wheel Co., water wheels for grinding, pumping, and electric lighting; Vermont Farm Co., dairy supplies; Boulton & Paul, garden furniture; C. S. Bell Co., church bells; Hawkins, steel trek chains; Bentall, disc mills; Scott Bros., Cape-made vehicles. The firm not alone sells, but has a competent staff of engineers for erecting the various plants sold by them. Messrs. Haarhoff & Co. claim to have erected more milling and pumping plants than all other firms combined.

Mr. Haarhoff, the manager of the Company, is a J.P., and takes a great interest in irrigation, and as such is considered an authority. On his private property he has constructed the largest private irrigation scheme carried out in South Africa.

When the farmer "finds his legs" again after having done with the locust, the Rhodesian pest, droughts, and all other ills, he has in the above-mentioned firm's establishment all requirements necessary to make farming a success.

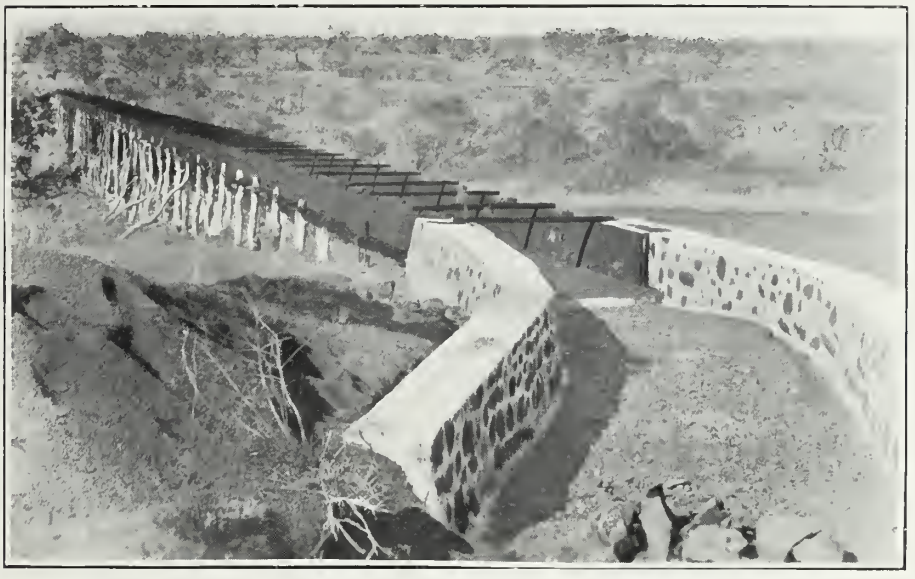
Boot Department of Mr. Hamilton's Store.

Interior of Mr. Hamilton's Outfitting Department.

MR. R. HAMILTON'S BUSINESS PREMISES, PRETORIA.

Mr. ROBERT HAMILTON.

The business of which Mr. Robert Hamilton is the principal was founded in 1887 at Barberton, where the firm established as high-class outfitters, dealers in boots, shoes, &c., both wholesale and retail. In August, 1891, a branch which has since become the head establishment was started in Pretoria. The Barberton business was disposed of in 1895, and the attention of the principal was concentrated upon the development of the branch in the capital. The handsome store now occupied by the firm in Pretoria ("Durban House") at the corner of Church and St. Andries-streets, was erected in 1896. The premises cover an area of 100 ft. by 90 ft., forming one of the most imposing blocks in the city. The stock of outfitting requisites here carried is very large, and the establishment is very tastily fitted in every respect. Modern outfitting requires skill and art in selection of ready-made suits, and among the excellent assortment of goods in the clothing department Mr. Hamilton's accomplishments and experience in this regard have adequate expression in the comprehensive display to be seen. Mention should be made of the skilful window-dressing, culminating in tempting displays of hats, gentlemen's linen, hosiery, ties, &c. Within, handsome showcases meet the eye and give a wide range of choice in the etceteras of a gentleman's complete attire. A special attraction, to the connoisseur customer, is in the boot and shoe department, where every style, fit, and quality is always on view. Mr. R. Hamilton was a member of the Pretoria Town Council, being chairman of the Works Committee. He resigned his seat in order to leave for the Old Country. During his absence, his son, Mr. Percy Hamilton, is managing the business.



One of the Flumes on the Zand-drift Irrigation Works of Mr. I. J. Haarhoff.

Messrs. E. G. HEATHER & CO.

This firm transacts one of the largest family grocery businesses in the capital city, in addition to being biscuit manufacturers and bakers. It dates back its existence to the year 1883, when it was established by its present proprietor, Mr. Edward George Heather. The premises in which the business is now carried on are situated next to the Grand Hotel in Market-street, and there is a branch factory in Pretoria-street West. Respecting the grocery portion of the business, the commodious establishment in Market-street is well suited to this branch of the concern, where large stocks of the highest quality of groceries are displayed to advantage. With regard to the biscuit manufactory, the firm claims there is a need for some protection from the Government. Since duties have been removed under the Customs Union tariff this section of the business has been heavily handicapped, although it is still being carried on. One of the largest items of Messrs. Heather & Co.'s business is the bread bakery, in which they employ the latest machinery and appliances. The result is a bread of excellent quality. To give some idea of the dimensions of this branch of the business, it may be stated that eight vans are kept occupied in daily supplying the city and suburbs with the "staff of life." The bakery is at the back of the retail establishment in Market-street. The total area covered by the premises is fairly large. Mr. Heather himself is of English parentage, of colonial birth, and has been a resident in the Transvaal for over 30 years. He takes a lively interest in the affairs of the district, and was one of the members of the first elective Town Council, being returned for No. 2 Ward. He was again re-elected without opposition. It may be mentioned that in the 1880-81 war Mr. Heather served with the Pretoria carbineers, and was wounded in action.

D. S. HUGHES & CO.

One of the new firms of Pretoria is that of Messrs. D. S. Hughes & Co., hardware merchants, whose premises are situated in Marks' Buildings, Church-street East. This firm has only been in existence a little over two years, but during that period has made wonderful strides. To-day it lays claim to the reputation of being one of the most up-to-date houses in the Transvaal capital. The stock carried comprises almost everything in the hard-

MR. D. S. HUGHES (Pretoria).

ware line, and a splendid assortment of crockery and glassware in addition. Leading lines are made of household ironmongery and lampware, and here Messrs. Hughes & Co. claim priority. Several large Government orders have been entrusted to the firm under

Bakery of Messrs. E. G. Heather and Co., Pretoria. Interior of Messrs. Heather and Co.'s Store, Pretoria. Messrs. Heather and Co's Premises, Pretoria.

notice, including the outfits required by the Education Department for the various cookery classes started in the district. Messrs. Hughes & Co. take pride in three cardinal principles:—First, low prices and quick returns; secondly, satisfaction to everybody; thirdly, courtesy to customers, and promptness in the execution of orders. show windows, with goods marked in plain figures, are a sensible advertisement. Everything that is offered for sale is disposed of subject to the approval of the purchaser, and if after fair trial it does not come up to expectations as stated by the salesmen, the firm are only too willing to take the article back and refund the money. combining business with pleasure. When he was in Europe several manufactories were visited, and the insight there gained has been of great assistance to him in South Africa. Before leaving London arrangements were made with an experienced buying agent to look after the European interests of his firm. All the indent-

PREMISES OF D. S. HUGHES & CO., PRETORIA.

There may be no doubt in the minds of those who have watched the growth of the business that Messrs. Hughes & Co. owe their present prosperity chiefly to reasonable prices, and to the fact that their stock is varied and comprehensive. Splendid The proprietor, Mr. D. S. Hughes, has been in the ironmongery all his life, and thoroughly understands it. Prior to opening in Pretoria, he had an extensive tour round the world, visiting in all thirty-four different countries and colonies, and ing is done by Mr. Hughes personally, and he has made a study of this most important branch. A visit to this well-appointed store is a convincing testimony that it is bidding fair to become a prominent house in the commercial circles of Pretoria.

MR. R. C. E. NISSEN.

Mr. Nissen, who has contributed considerably to the illustrations appearing in "The Transvaal and its Mines," is comparatively a recent arrival in Pretoria. His studios are comfortably and ornately appointed in a suite of rooms at the top of Tudor Chambers. He has taken and maintained a lead in his profession owing to the high-class quality of his work, not only in ordinary photography, but in carbon studies of local scenery, coloured enlargements, and other classes of artistic portraiture. The subject of this notice saw considerable service as a member of the "fourth estate" during the war, on behalf of the *Cape Times* and London *Daily Mail*, and entered Pretoria with the army of Lord Roberts. Since establishing business in the capital, Mr. Nissen has had the privilege of receiving sittings from numerous prominent personages, including H.R.H. Princess Christian and H.R.H. the Duke of Connaught. Among distinguished men who have been photographed by him during their stay in Pretoria may be mentioned Lord Roberts, Lord Kitchener, Mr. Chamberlain, Viscount Milner, Lord Selborne, and Sir Arthur Lawley. In the well-appointed gallery attached to the studio, which contains numerous works of considerable merit, may be seen pictures of these distinguished visitors. Mr. Nissen has an extensive *clientèle* among the Government officials and other prominent residents in the capital, and the excellent work accomplished in his studio secures for him also a large and increasing patronage of the general public.

RECEPTION-ROOM OF MR. R. C. E. NISSEN, PHOTOGRAPHER, TUDOR CHAMBERS, PRETORIA.

THE TRANSVAAL BOTTLING COMPANY.

The Transvaal Bottling Co. was established in Pretoria in 1884, with the object of supplying the best wines and spirits to householders and the public generally. The business is an important one, and has assumed considerable proportions. A large stock of foreign wines and spirits is annually imported, and is received by the consumer in the condition in which these liquors reach the firm. Wines and spirits of Cape Colony product are imported in bulk and bottled locally. The premises of the Company are situated centrally in Church-street, and cover an extensive area. It is claimed that the firm does the largest wholesale business of its kind in the city. Its operations are wholesale as

well as retail. In connection with the former branch the northern and eastern Transvaal is covered. The Company holds the sole agency for G. and J. Maclachlan's liqueur and ***Iona blend whiskies. The best brands of cigars and cigarettes are stocked by the firm. The business has achieved its present success solely through supplying only the best of everything, and at lowest prices. The manager of the business is Mr. M. H. O. Preller, who joined the firm 22 years ago. The Company's P.O. box is No. 106; telephone No. 70.

MESSRS. WILSON & WORTHINGTON

At the conclusion of hostilities, the military supply departments, both in the Transvaal and Orange River Colonies, found themselves in possession of huge quantities of stores of all descriptions, much of which would have been subject to deterioration during prolonged storage. It became necessary to find some means of disposing of these accumulations, for which no proper accommodation could be provided. Merchants had imported very

PREMISES OF THE TRANSVAAL BOTTLING CO., PRETORIA.

largely, and the military authorities experienced considerable difficulty in getting reliable firms to deal with the supplies, as these in a large number of instances were made up in special packages, rendering them difficult of disposal to the usual civil sources of outlet. The military surplus and perishable stores were tendered for by several firms of contractors. The best known of these were undoubtedly that of Messrs. Wilson & Worthington. This firm was established in December, 1902, there being two partners, Mr. Henry Wilson and Mr. Arthur George Worthington. The headquarters are in Pretoria, where an immense variety of stock is warehoused, and there are branch establishments in Johannesburg and at Germiston, where the work of distributing the military surplus stocks to the civil population at wholesale prices is carried on. In addition to the stock actually in the hands of the Director of Military Supplies, the organisation known as the Field Force Canteens, which was greatly curtailed with the sudden conclusion of peace, held a large quantity of stores which could no longer be dealt with. Much of this supply came into the hands of Messrs. Wilson & Worthington, as also did the large residue on the hands of the Transvaal Government when the work of repatriating the burgher population was completed. The firm did business throughout South Africa, its operations not being confined to the Transvaal alone; and it is beyond question that the public convenience was greatly served by this and kindred establishments. Our illustrations show the large extent of the firm's storage premises at the capital, where the chief portion of their stock is kept. Foodstuffs and forage of all descriptions, tinned, frozen, and fresh; cigarettes, cigars, and tobacco, and all kinds of requisites for man and beast, were taken over and dealt with by this business house.

FRONTAGE OF MESSRS. WILSON & WORTHINGTON'S PREMISES, PRETORIA.

YARDS OF MESSRS. WILSON & WORTHINGTON, PRETORIA.

PANORAMIC VIEW OF JOHANNESBURG.

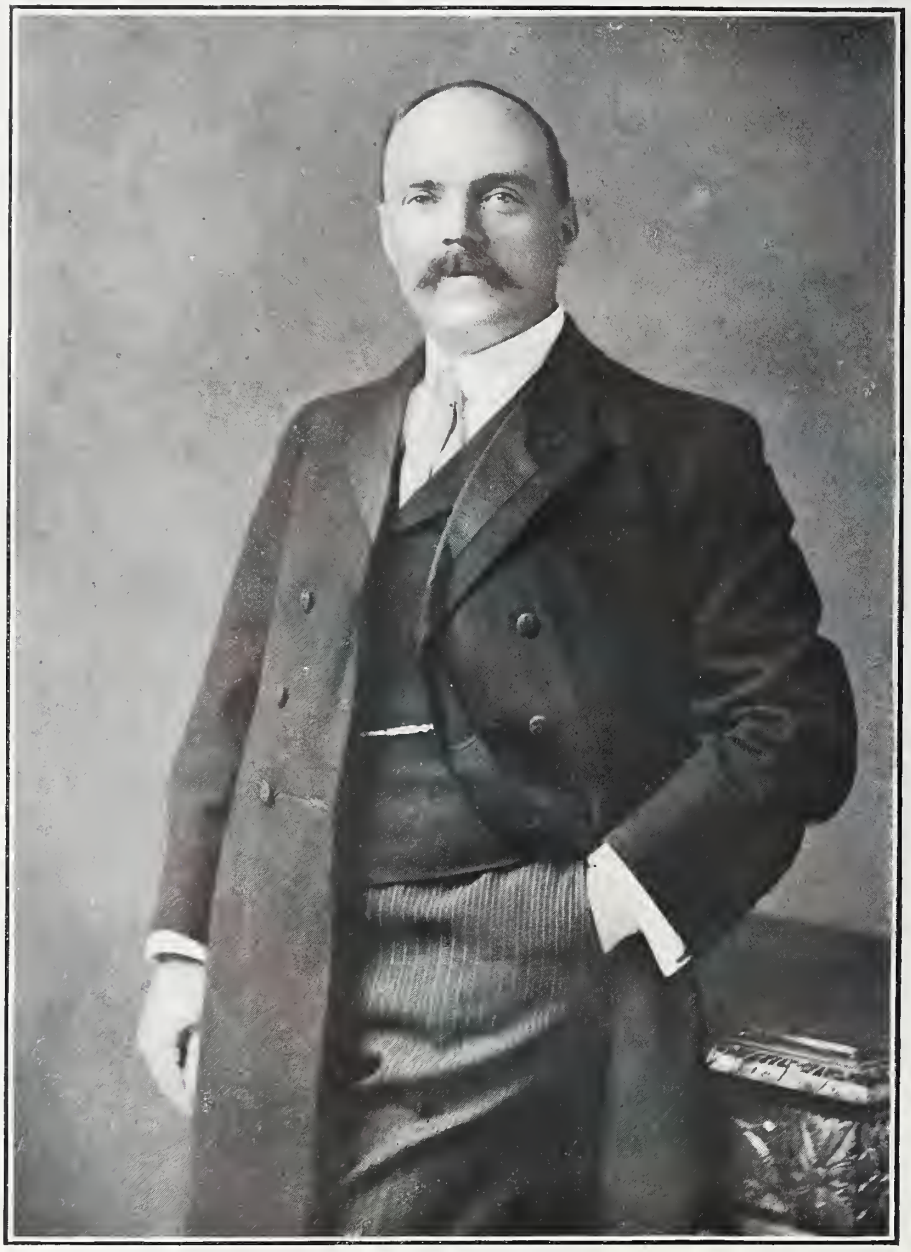
Johannesburg.

JOHANNESBURG, sometimes called the "Golden City," has a record in its brief existence which makes it one of the marvels of the world. Like all "gold rush" centres, this hustling town on the Transvaal High Veld sprang into being with mushroom growth. It incubated from a camp which speedily formed when it became known that underlying the locality was one of the richest deposits of gold yet discovered. It was a "find" in the heart of a comparatively unknown country—a pastoral territory inhabited by simple, frugal, but withal intrepid pioneers, to whose hearts the wilderness into which they had penetrated and had settled made strongest appeal. The Transvaal was unconnected with civilisation by railways or good roads, although traders from the Colony to the south had settled in its few small towns. The first discoveries on the Witwatersrand followed the initial gold rush in South Africa, which had as its objective the slopes of the Sheba Valley, on the eastern side of the Transvaal territory. Here Barberton, a town of tents and hardy miners and adventurers, quickly sprang into being upon gold indications being discovered. But the hopes held out to thousands who "roughed" the journey from the colonies into the heart of the feverish Low Country were not substantially realised, and many people returned to the parts from whence they had travelled. At this period prospectors by accident discovered the value of the reef formation of the Witwatersrand, and when its rich promises became established knowledge there set in the stream of immigration which founded the "Golden City." The struggles of the Rand pioneers have been written of in many quarters, but it yet remains for the man who is capable of doing so to give a connective record of the first few years of Johannesburg's existence. Again disappointment followed the eager rush of multitudes, for it was not in a day that the vast accumulation of wealth stored beneath the Rand Basin could be exploited. As usual, the first boom was followed by a slump. Transport was wearisome and expensive, and the first machinery to reach the Rand had to be drawn by bullock-wagon over hundreds of miles of veld roads. By degrees the system of transport—which claimed thousands of fortune-hunters among the colonists—became a tangible, business-like undertaking, and farmers in all quarters of South Africa left the plough and the flocks to become "kurveyors" (transport-riders) to the gold fields. Money was made rapidly in this work, for there was feverish demand for the necessities of mining and building operations, for machinery, and for the necessaries of life in the camp. Drought and cattle sickness, indeed, made the work of kurveying a hazardous undertaking, but men grew rich who were lucky and able to do the trip to the fields with three or four spans of oxen going. The dusty tracks to the northern El Dorado swarmed with long trains of wagons, and the excitements of the road were many. Volumes might be written of the rush and struggles of the first years of the making of Johannesburg, hysterical company-flotation, the gambling mania inseparable from a new rush, the wastefulness of men totally unused to wealth suddenly acquired, and the steady aptitude which covered the efforts of those who developed the first reliable properties—properties many of which to-day are equipped with the best modern appliances, and have reached and long maintained a rich dividend-paying stage. The extension of the railway from the Cape Colony was a grand step in the advance of the Witwatersrand as a mining centre, and of the wonderful town which had so startled the Boers with its strange virility and worldly rakishness. By degrees the wattle-and-daub huts and tin shanties of the first camp gave place to substantial erections of brick and stone, while mining headgear and machinery houses marked the line of the reef for miles with a cheerful premonition of things accomplished and to be done. Subsequent to the war of 1899-1902 the growth of Johannesburg was even more rapid. Up to that struggle its enterprising inhabitants had striven against many adverse conditions, but after peace was declared Johannesburgers set themselves to rear up a city of great buildings. To-day, although much remains to be accomplished to give the

"SUNNYSIDE," PARKTOWN, JOHANNESBURG,
where Lord Selborne resided in 1906.

city that settled comfortable appearance of older centres, there is in the Rand capital, with its very handsome structures and modern equipments, a marvellous revelation of what it is possible to accomplish when gold is the magnet in the space of 20 years. The census of 1904 gave a population in Johannesburg of about 160,000, more than half this number being whites.

The Witwatersrand capital lies 5,765 ft. above sea level, in lat. 26° 11′ south and long. 28° 3′ east, with a southerly aspect. The mean temperature in the shade is 60·9 Fah., and the barometer registers an average of 24·571 inches. The hot season is also the rainy season, and may be taken to last from October to April. The nights are generally cool in summer, in winter often distressingly cold. The climate is dry and bracing; dust storms are very prevalent, and owing to the impalpable white dust impregnated with cyanide thrown off from the mines "tailings," these storms have an injurious effect upon the health of the community. Pneumonia is prevalent, as are other forms of diseases of the breathing organs. The reef from which the gold is extracted extends east and west for upwards of 40 miles along the Witwatersrand (or "ridge of clear waters"), and the limits of the Rand, or ridge, are the mining town and railway junction of Springs to the east, and the town of Krugersdorp in the west. From the Rand to the Vaal River the country is hilly, the nearest group of hills to Johannesburg being the Klipriviersberg. The Natal Spruit, the Klipriviersprnit, and the Klip River, form a fertile tract of country close to the town, which is invaluable for farming and market gardening. The main reef is a bed of metamorphic conglomerate, the rocks outcropping at the surface in different spots. The bed has a dip of upwards of 50 degrees in a southerly direction. Formerly the water supply was a serious difficulty, being scanty and impure, water famines of a serious nature and fierce epidemics of enteric being the consequence. Since the inauguration of the town's water system, however, Johannesburg has been provided with a pure supply, from an underground source—large bodies of water having been tapped for the service of the Rand. The soil is dry, and owing to rapid evaporation by sun heat, and the violent torrential action of summer storms, moisture from the surface penetrates but little into the sub-soil. The certainty, in 1885, that payable reef existed on the Witwatersrand, resulted in the proclamation of the principal farms along the Reef as public diggings; and in September, 1886, the town of Johannesburg was founded. The first stands were sold by public auction in December that year, and possession of the stands was granted by the Government of the South African Republic in January, 1887. The first houses were erected in "Ferreira's Camp," but on the discovery that the reef ran through that portion of the settlement these houses were removed. The first brick and stone houses were erected in 1887. In the following year the Sanitary Board, newly appointed, forbade the erection of any more reed and other perishable or inflammable structures; tents became "few by degrees and beautifully less," and the first "camp" stage passed out of existence with extraordinary rapidity. To those early settlers who remember Johannesburg as a wilderness of blinding dust and scorching tin shanties, the change in a few short years must seem almost miraculous; indeed, it is without parallel in the history of the mining world. The town was named after Mr. Johannes Rissik, a Government official of the South African Republic, but for some considerable



MR. JOHN W. QUINN, Mayor of Johannesburg.

Photo: Duffus Bros., Johannesburg.

time was more commonly known in South Africa as the Rand. A Mining Commissioner carried on the local government until the establishment of the Sanitary Board at the end of 1887, when this body assumed control of the town affairs. The members of the Board were nominated, and the Mining Commissioner was Chairman, until 1890, when an elective body took the place of the nominated one, with a Government Commissioner and two Government nominees to share their counsels. In 1897 the Staatsraad, or Town Council, was appointed, the Burgomaster, or Mayor, being elected by the Government. The powers conceded to this body by the Government were very small, and a condition was made that one-half of the members were required to be burghers of the South African Republic. During the early part of the war, local government was carried on by the Burgomaster and such temporary officials as were appointed by the War Committee. On the occupation of Johannesburg by the British troops, on the 31st May, 1900, a military proclamation by the Governor of the town established a new, and nominated, Town Council, with twelve members presided over by a military officer as burgomaster. Lord Milner increased the number of these nominated Councillors to 26. In 1903, an elective institution was granted by ordinance. This ordinance decreed that the municipal franchise be extended to British subjects only, and that election carried office for three years, one-third of the Council to retire every year. This system of retirement was adopted by the nominated Council. Councillors were at first elective on the "ticket" system, the town being treated as a single constituency, but the popular demand for the ward system became so pronounced that the ordinance was amended, and the town was divided into ten wards, each returning three members. The Staatsraad had provided six ward divisions, each of which returned two members; these numbers were subsequently increased to twelve wards and twenty-four members. The present municipal franchise is granted to males and females of British nationality, of 21 years of age and upwards, who own rateable property of the assessed value of £100, or who occupy rateable property of the assessed value of £300, or premises to the gross annual value of £24; and who, in addition to this, have resided within the municipal area for three months. Societies, associations, and companies may be enrolled, and are entitled to vote through an official. Aliens and coloured persons were excluded from the municipal franchise, owing to the strong political bias displayed by the former throughout the war, and on account of the prejudice existing in the minds of the majority of the white community against the latter. The municipal area under control in 1898 was about five square miles, and had expanded to nine square miles in 1902. The Town Council then incorporated many out-

JOHANNESBURG, looking along Commissioner-street.

lying townships and suburbs in the municipal area, and the extent now embraced is 81¾ square miles. This includes much mining property, and enables the Council to carry out comprehensive and systematic schemes of lighting, drainage, and water-carriage, to secure unity of administration in respect of these important matters, and to safeguard the public health. The rateable value of the Johannesburg municipal area in 1895 was £5,372,734. In 1897 it had increased to £19,843,080, for an area of about five square miles. About £16,000,000 of this was land value alone. In 1902 the rateable land value was £22,368,993, and that of the buildings £5,074,643, the area included being then about nine square miles; and at the beginning of 1906 the rateable value of the land stood at £29,772,899, the total with buildings being £43,878,071 for the complete area of 81¾ square miles. The population in 1887 was about 3,000, in 1890 it was 26,303, in 1896 a census return gave 102,078, of whom 50,907 were whites. The census of 1904 gave a population of 155,642, of whom 83,363 were whites. Of these, 29,349 were married persons, four-sevenths of whom were males. Males were in excess of females by nearly twice the number in the ages above sixteen. Below that age the numbers of the sexes were almost equal. The number of voters on the roll at the time of the municipal elections of 1905 was 23,338, of whom 1,550 were women. The number who recorded their votes were 5,821. During the year ending June, 1905, 2,964 white births were registered, giving a birth-rate of 35.5 per thousand as based on the census returns of 1904. This was a large increase on the preceding year, which registered a birth-rate of 29·2 per thousand. The number of coloured births for 1905 was 573, the majority of native births taking place in the country districts, native women rarely coming to live in the towns. The number of white deaths for the year ending June 30th, 1904, was 1,539, and for the following year 1,345. Deducting non-residents, the death-rate was 15·2 per thousand. The infantile mortality was 185 per thousand of births in 1904, and 153 in 1905. Diarrhœa and dysentery, pneumonia and enteric fever, tubercculosis and miners' phthisis, were the principal causes of death among the white population. The number of deaths among the coloured population for the year ending June, 1905, was 2,353, of whom 1,442 died in the mining area. Pneumonia accounted for by far the larger number, enteric, dysentery, tuberculosis and diarrhœa being again causes of a preponderance of the deaths. In 1905 the number of European marriages was 1,155, being a rate of 27·7 per thousand, as against 28·6 during the preceding year. The muni-

FOUNTAIN IN JOUBERT PARK, JOHANNESBURG.

cipal revenue for the year ending June, 1906, was estimated to reach £905,671, and the expenditure for the same period £891,647. The railway which runs through Central Johannesburg from east to west serves along the line of reef, with stations at the various mines, and the system does not touch the suburbs to any appreciable extent. The extension of the main trunk line from Capetown reached Johannesburg in 1892; the line to Delagoa Bay was completed in January, 1895; and the connection with Natal followed in December, 1895. Goods imported from the coastal Colonies and Delagoa Bay totalled an amount of 469,889 tons for the year ending June, 1905; for the year ending June, 1898, the total was 413,500 tons. In 1903 a record was established, goods to the amount of 1,066,067 tons being imported. The inflation was due to large military demands and to the necessity of renewing stock that had been depleted or deteriorated during the war, also in a great measure to a serious over-estimate of the probable demand. This discounts considerably the substantial decrease in the following two years, not so serious as it might at first appear. Johannesburg absorbs over 40 per cent. of the total tonnage brought to the Transvaal by rail, produces within the municipal area 44½ per cent. of the total gold output of the country, and monopolises more than 50 per cent. of the work of the Department of Posts and Telegraphs (including telephonic operations also). It has the largest area and highest rateable value of any town in South Africa, and contains 28 per cent. of the white population of the sub-continent. The Town Council, when first nominated by Lord Milner, had to face many serious problems. The enforced neglect of outlying sanitation, the wretched state of roads and streets from ill-usage and neglect during war-time, the difficulty of obtaining labour and transport animals, military and repatriation requirements being necessarily the first consideration, the crying demand for a more cleanly and cheaper sewage and sanitary scheme, the clamour for cheaper water, more lighting, and means of locomotion to the mass of new suburbs springing into existence; all these matters were pressed on the Council at once, with an insistance that forced attention. Big schemes were considered and adopted, to meet all these demands, and though accusations of extravagance, optimism, and ineptitude have been levelled at the Council by many critics, it has daily become more apparent that vast improvements of a lasting and substantial nature have resulted from these schemes.

MARKET-STREET, JOHANNESBURG.

A glimpse of the steadily increasing growth of Johannesburg is given in official figures dealing with the progress of building operations during the quarter ended September 30th, 1905. In that period no fewer than 922 plans were passed by the Works Committee of the Johannesburg Town Council. These plans dealt with 2,344 structures of various kinds, representing a total value of £752,103, and providing accommodation for 6,608 persons. July saw the largest value of buildings and alterations sanctioned; in that month 309 plans were approved for 857 erections. For August the number of plans was 316; buildings, 872. For September the plans numbered 297; buildings, 615. The above figures, compared with the records of the previous year, show that the quarter under notice gave a considerable increase in the number of buildings, value, and accommodation provided. During the year and nine months ended September 30th, 1905, the municipal authorities approved of plans for 13,109 separate buildings and tenements. Since July, 1903, up to September 30th, 1905, plans were passed by the Johannesburg Town Council for buildings worth £5,522,511.

The new Johannesburg is a city of considerable architectural importance, with many buildings of public interest. Among these may be ranked the Rand Club, the "Corner House" (Messrs. Eckstein's) and National Bank, the Chamber of Mines, the new Stock Exchange, Sauers Buildings, and many others. The above we are able to illustrate here. The Rand Club—famous as the centre of most of the stirring events in the country—has lately been rebuilt. It is an imposing structure, with fine façades to three streets, the principal entrance being from Loveday-street. It is in a free classical renaissance style of an effective character. Internally it is probably the most striking building in the town, full of beautiful detail and well adapted for comfort. The entrance-hall, lounge, dining-room, and reading-room are the chief centres of interest. It contains bedroom accommodation for some 60 members—all fine rooms. The "Corner House" is famous as the headquarters of the important firm of Eckstein & Co. It was the first "sky-scraper" erected in Johannesburg. It is some 10 storeys high, and forms with the National Bank premises one great block of buildings. It is also of renaissance style, and is specially designed internally for office accommodation. Its five-lift service is one of the best known in the world. All offices are well lighted, and the whole building, on something of American lines, is a great success. The Chamber of Mines adjoins the National Bank, and although built many years ago is still one of the finest

VIEWS OF THE RAND CLUB, corner of Commissioner and Loveday-streets, JOHANNESBURG.

Exterior. Upper Staircase Hall. Library. Staircase Hall. Billiard Room in Basement. Dining Hall.

Architects: Leck & Emley, Johannesburg.

architectural façades in town. Here the principal meetings in connection with the great gold mining industry are held. The new Stock Exchange is also a big block—the exchange hall being placed in the centre, with offices all round. Architecturally it is of great interest internally and externally, and is one of the striking buildings of the Golden City. Sauers Buildings—another office block—stands on the Market Square. This is one of the later buildings, and one of the most interesting externally. It is a lofty structure of six storeys with basement. Its long upright lines give it an imposing look, and remind one more of English work. All the buildings mentioned above were carried out by the same architects—Messrs. Leck & Emley, Johannesburg, whose offices are in Trust Buildings. Besides these public buildings, many private residences of merit were also undertaken by the same firm—notably Mr. Lionel Phillips's private residence, "Hohenheim," with one of the finest views imaginable; Mr. F. Eckstein's private residence; Mr. Reunert's, and many others. One or two of these we show in our illustrations.

S.A. Investment and Trust Buildings, Johannesburg. Erected 1897.

Architects: Leck & Emley, Johannesburg.

Other buildings of newer Johannesburg which attract attention include the large residential buildings in Eloff-street, the Walter Block, S. James's Mansions, and the Castle Block. The last-mentioned was the first to be completed. It is used for the offices of the High Commissioner in the absence of permanent Government buildings in Johannesburg. The Natal Bank Buildings in Market-street are a fine addition to bank edifices, and the new premises of Messrs. Harvey, Greenacre & Co., in Rissik-street, and of Messrs. Beckett & Co., in President-street, are also fine examples of solid and ornate architecture. The National Mutual Life Association of Australasia has a handsome and imposing structure in Market-street which is a distinctive feature in the perspective from all points of the Market Square. All the buildings here mentioned are so constructed as to be at once connectable with the town main drainage when the municipal scheme comes into use. The buildings under notice in each case were planned and constructed by Messrs. McIntosh & Moffat, of Jeppe Arcade, a well-known Johannesburg firm of architects, also responsible for the erection of His Majesty's Theatre, Commissioner-street, and the buildings for the new Empire Palace of Varieties. The latter block, which is of considerable proportions, is constructed on the most modern and improved plans. Messrs. McIntosh & Moffat also had under construction the Corporation Buildings (where the "Staatsraad" and the first Municipal Council of Johannesburg occupied a fine suite of offices), and Mr. Julius Jeppe's beautiful residence in Belgravia.

Hotels.—Concerning the hotels of Johannesburg, of which there are a large number of well-conducted establishments, up till recently Heath's was considered the leading house, with the Goldfields, the Victoria, and the Grand National following closely on its heels. Before the opening of the new Carlton Hotel the accommodation for families was inadequate, but with the advent of the Carlton the city is now supplied with a hotel equal to any to be found in the principal cities of the world. The Carlton has a frontage of 260 ft. on four streets—Commissioner, Eloff, Joubert, and Market-streets, occupying an almost entire block of 206 ft. square, with the exception of a corner cut off at the junction of Joubert and Market-streets. The building is of white stone, and has French windows opening on the first floor to a balcony running round the entire block. The hotel is luxuriously furnished, and contains a Turkish bath in the basement.

The growth of Johannesburg has been unprecedented, and the number of "townships" and suburbs which have become part of its whole area, and with such rapidity, is now 96. These suburbs, with the town proper, all included within the municipality, cover an area of 81¾ square miles, with a length of 719½ miles of streets or roads. Most of them will eventually be served by the town lighting, water, and sewage schemes within the municipal administration. The more important townships are owned by large corporations and companies, the chief of which are the Estate Department of

the Consolidated Gold Fields of South Africa Gold Mining Company, Limited: the Johannesburg Consolidated Investments Company, Limited: the Witwatersrand Township, Estate, and Finance Corporation, Limited: and the Townships branch (Government) Mining Rights. The rents and licenses derived from these township properties form a source of considerable income to these companies, many of which also own mining and other interests. Certain townships belong to private individuals, and a few are the property of the Government and the Municipality.

New Premises of Messrs. T. W. Beckett & Co., Limited, Harrison and President-streets, Johannesburg.

Architects: McIntosh & Moffat, Johannesburg.

These townships lie within a radius of five or six miles from Market Square—the recognised centre of Johannesburg. Others are daily coming into existence, outside the municipal area, in parts that will be easy of access by the municipal tramway communications.

The following particulars having reference to the suburban townships, their area, municipal valuation (1906), controlling proprietary, and distance from the centre of Johannesburg, will be found of interest:—

The Witwatersrand Township, Estate, and Finance Corporation, Ltd., founded and owns the following suburbs and townships:—

Name of township.	Area in acres.	Number of stands.	Municipal valuation.	Streets in miles.	Distance from Market Square.
Fordsburg	131·68	795	£1,098,580	6·73	Within a mile, west.
Jeppestown ...	436·00	2,734	1,732,245	18·19	Two miles, east.
Belgravia ...					Three miles, east.
Wolhuter	27·87	168	152,660	1·52	Two miles, east.
Malvern	439·18	1,799	172,739	12·50	Within four miles, east.
Bellevue	108·57	607	290,329	4·99	Within three miles, north-east.
Bellevue East	81·89	500	183,601	2·68	Within three miles, north-east.
North Doornfontein ...	11·73	96	73,002	·53	1½ miles, north-east.
Spes Bona	6·74	49	32,392	·39	Three miles, south-east.
Kew	(Now in process of delimitation.)				——

(The townships of Jeppestown and Fordsburg, the property of the above Corporation, were the earliest extensions of Johannesburg, and are perhaps the most populous. They lie, Jeppestown to the east and Fordsburg to the west of the town, in an almost direct line. They were founded in 1887. Wolhuter is a mining township; Belgravia, Bellevue, and Bellevue East are pretty and fashionable suburbs. The others in the list are new and comparatively little known.)

The Consolidated Gold Fields of South Africa Gold-mining Co., Ltd., controls some very important properties all along the Reef. The following is a list of those within the municipal area:—

Name of township.	Area in acres.	Number of stands.	Municipal valuation.	Streets in miles.	Distance from Market Square.
Booysens	168·91	290	£128,101	5·53	Within three miles, south-west.
Booysens Reserve ...	73·7	420	59,502	3·33	Within three miles, south-west.
Forest Hill	117·16	662	79,436	4·85	Within four miles, south.
La Rochelle	107·46	611	150,102	5·58	Within three miles, south.
Heronmere	—	—	49,144	—	Two miles.
Turffontein	431·37	1,628	439,510	15·32	Within three miles, south.
Turffontein West ...	239·77	146	102,661	—	Within three miles, south.
Victoria	29·63	29	13,113	·29	Within four miles, north-east.
Oakdene	(Not included in the municipal returns at the date of writing.)				Within five miles, south.

(On the Turffontein Estates valuable gold properties exist, and are in process of development. Booysens is one of the older suburbs, and has a mining population of the labouring class.)

The Johannesburg Consolidated Investment Co., Ltd., which is closely allied to the house of Barnato Bros., holds some very flourishing township properties. Though newly laid out they are already largely covered with buildings, which sell or let very readily. Those included in the municipal area are the five given below:—

Name of township.	Area in acres.	Number of stands.	Municipal valuation.	Streets in miles.	Distance from Market Square.
Berea	239·68	1,339	£609,353	9·48	Two miles, north.
Yeoville	244·40	1,208	642,102	11·44	Within three miles, north.
Houghton Estate ...	1,715·79	2,047	583,608	37·60	Within three miles, north.
Old Doornfontein	108·37	609	795,632	4·62	1½ miles, north-east.
Fox's Reserve ...					
West Dene	384·85	1,381	46,690	13·94	——

(Old Doornfontein dates from the same period as Jeppestown and Fordsburg, but is no longer in much repute as a residential suburb, being low-lying and crowded. Berea lies above Hospital Hill, on the highest point, and Yeoville stretches beyond. Both are healthy, airy suburbs, with well-to-do, well-planned residences. Barnato Park, the residence designed but never used by the late Barney Barnato, stands in the Berea, an enclosed plantation of gum trees. This is being used by the Government as a college for boys. The Houghton Estate overlooks Orange Grove and the extensive plantations in that vicinity, and some handsome houses, built on the ridge which overhangs the Orange Grove Valley, command a majestic view of forest land, cultivated property, and veld, away to the Magaliesburg hills. The golf links, and club house attached, are situated on the Houghton Estate.)

The Townships Branch of the Registrar of Mining Rights department has a controlling influence over several holdings that belong to private persons and companies, besides controlling those portions of the town that are purely Government property. The latter embrace the town of Johannes-

burg, as originally laid out; the former, such townships as were subsequently founded on an undertaking that the Mining Rights department should have a controlling influence and should receive a share of the licence moneys. There exists, therefore, a species of dual control in which the Government has a preponderating influence. The principal townships thus controlled are:—

Name of township.	Area in acres.	Number of stands.	Municipal valuation.	Streets in miles.	Distance from Market Square.
City & Suburban ... (owned by City & Suburban Gold Mining & Estate Co., Ltd.)	125·33	873	£1,110,640	7·00	1½ miles, east, central, on the reef.
Ferreira's Township ... (owned by F. J. Beznidenhout).	42·31	282	587,675	2·43	1½ miles, west, central, on the reef.
Fawcus, or Fairview ... (owned by M. H. Fawcus).	—	—	332,776	—	Within two miles, east.
Denver ... ... (owned by Scrutton's Plantation Co., Ltd.)	88·58	573	140,194	4·42	Within three miles, east.
Albertskroon ... ... (owned by the Albert family).	116·96	1,215	12,480	4·39	Five miles, north-west.
Oakleigh ...	(Dealt with above.)				
Booysens ...					
Lindique	(Not entered in municipal valuation roll.)				1½ miles, north-west.
Mayfair	379·56	2,297	507,359	17·77	1½ miles, west.

The Government properties are:—

Name of township.	Area in acres.	Number of stands.	Municipal valuation.	Streets in miles.	Distance from Market Square.
Johannesburg ... (including part of Braamfontein, Hospital Hill, and Hillbrow).	509·96	2,524	£14,951,408	23·02	Central town.
Burgersdorp	40·92	311	429,165	2·08	Two miles, west.
Vrededorp ... ... and locations.	273·03	3,011	483,697	18·19	Two miles, west.
Sunnyside	8·51	55	10,675	·62	Within two miles, north-west.
Burnbrae	2·34	12	2,811	·05	——
Railway residential property.	—	—	222,112	—	Central town.
Rosebank	201·09	174	44,995	5·03	Within four miles, north.

(Burgersdorp was granted and laid out by order of President Kruger for *bywoners* and "poor whites" who were destitute or landless. Vrededorp, and the locations for kafirs and Asiatics which encroach on its borders, is crowded with a Dutch and coloured population of a low class. The City and Suburban township borders on the mining property worked by the gold-mining company of that name, and is situated on the reef south of Doornfontein. Ferreira's Township, to the west, is also a mining neighbourhood, perilously like a slum.)

The African Realty Trust Co., Ltd., controls the following:—

Name of township.	Area in acres.	Number of stands.	Municipal valuation.	Streets in miles.	Distance from Market Square.
New Doornfontein, Doornfontein Gardens, and Charlton Terrace.	195·48	905	£877,488	9·34	Within two miles, east.
Orange Grove	332·00	1,971	99,926	13·77	Within four miles, north-east.
Parkhurst	401·04	2,146	32,211	17·45	Four miles, north-west.
Parkmore	—	—	—	—	Five miles, north.
Marlborough	(Not included in the municipal returns at the time of writing.)				Five miles, north.

(New Doornfontein and adjacent properties, divided from Old Doornfontein by Siemert Road, a broad thoroughfare with a double avenue, form charming

Jules-street, Jeppestown, Johannesburg.

suburbs, with well-planted streets. The houses mostly stand in pretty gardens, the traffic is slight, and the trams run conveniently and frequently. Orange Grove is a lovely, well-watered stretch below Bellevue, Mountain View, and the Houghton Estate, the Pretoria main road running through it. There are extensively cultivated grounds, a good hotel which is a popular Sunday resort, and swimming baths supplied with water from a running stream which irrigates the whole neighbourhood. Parkhurst was named by public competition, a prize of £100 being divided between the candidates who

Marshall-street, Jeppestown, Johannesburg.

suggested the most suitable name, and a further £100 given to any such candidate who had bought a stand in the new township.)

Another large holder of suburban property is the firm of Messrs. van Boeschoten & Lorentz, which owns the following :—

Name of township.	Area in acres.	Number of stands.	Municipal valuation.	Streets in miles.	Distance from Market Square.
Troyville	154·48	725	£632,440	6·79	1½ miles, north-east.
Lorentzville	87·82	280	203,735	1·88	Two miles, east.
Judith's Paarl... ...	78·95	377	146,731	2·56	Within three miles, east.
Bezuidenhout Valley ...	434·72	1,695	379,320	16·21	Within three miles, east.
Observatory	489·22	301	222,025	11·19	Within three miles, north-east.
Highlands	31·98	32	28,472	·38	Within two miles, east.

(Troyville, which has charming houses and gardens, is inaccessible, and on too severe a slope, and therefore has never been a popular suburb. Judiths' Paarl, Lorentzville, and Bezuidenhout Valley are a continuation of Doornfontein and Bertrams, and are prettily situated. High above them stands Observatory, where the Government has a meteorological observation post.)

The Braamfontein Estate Co. controls some beautiful property, the Parktown and adjoining estates being exquisitely situated and laid out on a handsome scale. No business premises are allowed to be built in Parktown.

Name of township.	Area in acres.	Number of stands.	Municipal valuation.	Streets in miles.	Distance from Market Square.
Braamfontein ... ... (Clifton).	62·61	700	£125,580	5·83	1½ miles, north-west.
Parktown	842·38	584	1,007,260	17·78	1¼ miles, north.
Forest Town ... ... (Parktown).	1,456·00	(not laid out)	108,337	14·11	1½ miles, north-west.
Marienhof ... ... (Parktown).	—	—	24,286	—	1½ miles, north.
Parktown Terrace ...	52·239	24	106,317	—	1½ miles, north.
West Cliff	86·44	86	164,366	4·24	Two miles, north-west.

(These suburbs are finely wooded, and are the most desirable and sought after for residential purposes by the wealthy families on the Rand.)

Barnet's Land Office Co., Ltd., own the following estates :—

Name of township.	Area in acres.	Number of stands.	Municipal valuation.	Streets in miles.	Distance from Market Square.
Oaklands	247·48	226	£81,620	5·41	Four miles, north-east.
Orchards	172·20	232	68,573	5·07	Four miles, north-east.
Norwood	189·39	1,118	99,842	9·21	3½ miles, north-east.
Argyll	3·88	31	49,930	·08	¾ of mile, north.
Fairwood	22·92	141	6,600	2·08	3½ miles, north-east.

(The above suburbs are mostly situated beyond Orange Grove, on and near the Pretoria main road. They lie in a fertile valley, well wooded, well watered and sheltered. They are not yet connected with the town water or lighting systems.)

Mr. O. J. J. van Wyk owns the following township properties :—

Name of township.	Area in acres.	Number of stands.	Municipal valuation.	Streets in miles.	Distance from Market Square.
Waterval	345·44	546	£16,651	10·00	Six miles, north-west.
Waverley	305·56	109	38,438	5·65	5½ miles, north-west.
Richmond	54·55	222	85,874	2·05	Within three miles, north-west.
Riviera...	50·00	17	36,800	·76	Three miles, north.
East Town	28·01	396	13,048	·90	Five miles, north-west.
Emmarencia	606·98	730	31,833	8·47	4½ miles, north-west.
Linden	—	—	17,562	—	5½ miles, north-west.
Melville	269·47	946	143,251	11·33	Three miles, north-west.

Other holders of suburban properties are mentioned below, with the townships they control :—

Name of township.	Area in acres.	Number of stands.	Municipal valuation.	Streets in miles.	Distance from Market Square.
Mar-hall's Township ...	142·64	980	£5,351,280	8·52	Central, south.
Abbotsford	47·88	55	9,972	1·03	5½ miles, north.

(S. A. Investment and Trust Co., Ltd.)

Premises of the Natal Bank, Limited, Market-street, Johannesburg.

Architects: McIntosh & Moffat, Johannesburg.

Market Square, Johannesburg

(showing General Post Office before enlargement).

The Jeppe Arcade, Commissioner-street, Johannesburg.

Architects: McIntosh & Moffat, Johannesburg.

Name of township.	Area in acres.	Number of stands.	Municipal valuation.	Streets in miles.	Distance from Market Square.
Auckland Park ...	381·94	531	253,901	10·34	Two miles, north-west.
Brixton	133·27	702	100,347	6·42	Two miles, north-west.
(Auckland Park Real Estate Co., Ltd.)					
Bramley	280·11	309	18,338	6·54	Six miles, north-west.
Athole			(Not yet assessed)		Six miles, north-west.
(Mr. J. C. Kirkwood.)					
Albertville	121·76	1,497	66,788	6·01	Five miles, north-west.
Albertville Extension...	14·01	126	1,831	·59	Five miles, north-west.
Newlands	317·74	2,173	—	15·86	Four miles, north-west.
Newlands Extension ...	94·01	587	—	3·54	4½ miles, north-west.
(Mr. B. L. Rorich.)					
Claremont	263·74	1,218	42,462	11·35	5½ miles, west.
Illovo	142·56	127	12,393	2·75	Five miles, north.
Dunkeld	167·02	199	18,012	4·06	—
(African Land and Investment Co., Ltd.)					
Martindale	49·81	332	9,172	1·65	Four miles, north-west.
Parktown North ...	423·64	595	48,222	8·77	Four miles, north.
(Mr. A. Meikle.)					
Craig Hall	(Not included in the Municipal Valuation Roll.)				
Sydenham	292·00	1,806	—	13·16	Four miles, north-east.
(Mr. F. Hathorne.)					
Highlands North ...	291·09	1,448	56,825	11·23	4½ miles, north-west.
Hillside			—	—	4½ miles, north-west.
(Mr. Julius Rosen.)					
Melrose...	184·74	215	54,535	6·17	Four miles, north.
(Langlaagte Exploration and Building Co., Ltd.)					
Ophirton	126·93	521	233,185	4·40	Two miles, south.
Lake View	17·14	159	19,953	·80	Two miles, south.
(Mr. F. Caithness.)					
Rosettenville	277·96	908	250,037	7·69	Three miles, south.
Rosettenville Extension	222·33	972	Included above	5·81	Three miles, south.
Rouxville	52·11	12	9,095	1·03	Five miles, north-east.
(Mr. A. V. Rosettenstein.)					
Wanderer's View ...	12·39	112	178,812	·41	Central, north-west.
Regent's Park	114·56	684	24,709	3·02	
(Messrs. Goldreich Bros.)					
Kensington	1,370·23	7,610	601,283	33·34	Three miles, east.
(Mr. Max Langermann.)					
Klipriviersberg ...	569·696		99,109	—	Three miles, south-east.
(Klipriviersberg Estate Gold-mining Co., Ltd.)					
Kenilworth	—	—	—	—	Three miles, south.
(Kenilworth Estate and Finance Corporation, Ltd.)					
Mountain View ...	62·13	52	63,427	1·38	Three miles, north-east.
(Mr. H. B. Papenfus.)					
Sophia	243·07	1,708	33,930	10·4	Five miles, west.
(Mr. C. Meyer.)					
Fellside	25·37	165	8,848	1·07	Three miles, north-east.
(The African City Property Trust Co., Ltd.)					
Birnam...	34·32	106	1,510	1·42	Within five miles, north-east.
(Mr. Richard Currie.)					
The Gardens	57·23	188	19,543	2·12	Four miles, north-east.
(Trustees of the Roman Catholic Church property.)					
Paarlshoep	88·00	172	97,797	2·63	Within four miles, west.
(Monsieur Jacques Lebaudy—"Emperor of the Sahara."					
Cleveland	(Residential property within a mining area.)		16,865	—	4½ miles, east.
Prospect	(Residential property within a mining area.)		20,070	—	Four miles, east.

Government Square is freehold, the property of a syndicate which is erecting buildings on an extensive scale on this site. The old Government Building stands on the Square, and contains the Magistrates' Courts and offices, and the headquarters offices of the Transvaal Town Police and the Criminal Investigation Department. Von Brandis Square has reverted to the Government by purchase. It is reserved for public buildings. This property is not rateable. "Sunnyside," the Johannesburg residence of the High Commissioner, must not be confused with the suburb of that name. This handsome house and property, situated on the slope of a kloof between Parktown and the Houghton Estate, was purchased by the Government from Mr. Hennen Jennings. The portions of the original farms upon which Johannesburg and its suburbs were built, and which are not occupied by townships, are valued collectively at £1,569,481. Municipal property, which includes "Newtown" (expropriated "insanitary area") refuse destructor sites, power and lighting stations, &c., is valued at £1,341,878. With the removal of the present locations, and the improvement thereby resulting, another valuable site will be added to the municipal property. In addition, also, the new location area reserved at Klipspruit (outside the municipal boundaries) will represent considerable value.

Municipal Revenues.—The sources of municipal revenue are lighting, water, and sanitary charges, assessment rates, rents from municipal property, and returns from the municipal tramways, fines for breaches of municipal bye-laws, and licences issued within the municipal area. Licences are necessary for bicycles, wheeled vehicles of all kinds, and dogs, in addition to trading and business licences. The outstanding loans raised by the town for public works and improvements since the war amount to £5,500,000, issued in sums of £1,500,000 at 95 in December, 1903, £1,500,000 at 93 in May, 1904, and £2,500,000 at 99 in March, 1905. The loans all carry interest at 4 per cent., and are redeemable in 1934: the latest and largest loan was taken over by the National Bank of South Africa at £97½ net. An excess of £402,853 is estimated in the expenditure to June, 1906, tramways and lighting scheme, the laying out of expropriated insanitary areas, and sewage and storm-water drainage schemes being undertaken on an extensive and costly system. These works will not be completed for some considerable time. The different municipal departments through which the

business of town is carried on are the the Town Clerk's department, the Town Treasurer's department, the department of the Town Engineer, the Medical Officer of Health, and sub-departments dealing with licensing, assizing, lighting, water, tramways, sanitation, and scavenging.

Municipal Responsibilities. — The Municipality of Johannesburg has no poor-relief organisation as yet, and had up to the end of 1905 subsidised sundry of the philanthropic and charitable institutions of the town. The Rand Aid Association received £600 per annum, the Salvation Army £300 towards the maintenance of its shelters and refuges, the Nazareth House £300, the Undenominational Children's Home £200, S. Margaret's Orphanage £200, the Dutch Orphanage £300, and the Guild of Loyal Women £150, all these sums being granted yearly. The Municipality is responsible for no education rate. The burial of paupers dying within the municipal area is provided for by the Council, and the cemetery is also under its control. The present burying-ground is one mile from the Market Square, in the direction of Braamfontein. It is not expected to be available much later than 1908, when a site for a new burial-ground will need to be selected. The cemetery is divided into sections for the different communities—thus, the Christian Europeans have their own section, and the Dutch, Jewish, native, and Asiatic divisions of the populations are provided for in the same manner. There si also a portion specially reserved for the graves of British soldiers, which is carefully tended by the members of the Guild of Loyal Women, who arrange that a commemoration service shall be held in the cemetery once a year. The Rietfontein lazaretto or isolation hospital is partially maintained by the Johannesburg Municipal Council, with assistance from the Government, for the use of patients suffering from infectious diseases. Cases of smallpox, scarlet fever, enteric, diphtheria, erysipelas, and other contagious or infectious illnesses, are compulsorily removed to the lazaretto if nursing cannot be safely carried out in the patients' own premises. No cases of smallpox are allowed to be nursed elsewhere than in the lazaretto. Lepers are sent to the leper asylum, Pretoria. Persons suffering from bubonic plague are also removed to Rietfontein, where a plague camp has been laid out with care, a suspect or watching camp being placed in close proximity. Special sections have been defined in both plague and suspect camps for male and female, European, native, and Asiatic accommodation respectively. The farm "Rietfontein," which is Government property, lies on the main road to Pretoria, about eight miles from Johannesburg. The Government devotes this estate to hospital purposes, and an establishment is also maintained there for senile, imbecile, paralytic, and other incurable cases. The care of these outlying hospitals is in the hands of one medical superintendent, who is responsible to the Johannesburg Municipal Council, and to the Assistant Colonial Secretary for Urban Affairs. Burials are conducted at the lazaretto when desirable.

The Morning Market.—The market of Johannesburg for some seventeen years was owned and controlled by a concession company, under a grant from the Government of the South African Republic, in 1889. It remained the property of the concession until the commencement of 1906, when the Town Council decided to expropriate. The formal ceremony of expropriation took place on the 2nd April, the keys of the market buildings being handed to the Mayor of Johannesburg. The buildings, centrally situated in the Market Square, are to be removed entirely at a later date, and the space they now occupy devoted to Government and municipal buildings. The market will then be established in close proximity to the railway goods department, a far more suitable and convenient site in many respects, both for the public and the market vendors. There is only one morning market in Johannesburg. It is supplied with produce from all quarters of South Africa. The final decision to expropriate the Johannesburg Market Company's concession and property was arrived at by the Johannesburg Town Council in February, 1906, with the assistance and co-operation of the Government. The arrangement come to was that the concessionaires should receive £160,000 for their property and concession, of which sum the Government undertook to pay £94,000, retaining the western portion of the Square for public buildings. The eastern portion of the Square will remain the property of the Municipality, and in this part will be erected permanent municipal buildings and offices in lieu of the temporary wood-and-iron buildings now in use. The carrying out of plans for the new market buildings had to be held in abeyance until funds were available, many large municipal schemes being still incomplete at the beginning of 1906. When this matter can be placed on foot, it is the intention of the

MR. F. ECKSTEIN'S HOUSE, JOHANNESBURG. Erected 1895.

Photo.: Duffus Bros., Johannesburg. *Architects: Leck & Emley, Johannesburg.*

town authorities to also erect properly-organised public *abattoirs*, and to inaugurate municipal bathing places for the public—a much-needed requirement in dusty Johannesburg. Until these improvements are carried out, the Market Square of the "Golden City" will continue to be a centre of filth and disorder. Inside the market house, under the supervision of officials called market-masters, every variety of fruit and vegetable producible in the country is displayed for sale on tables in long rows, the vendors being Jews, Greeks, Portuguese, Syrians, and other Asiatics, coloured persons of all shades, and a sprinkling of Boers. It is on these tables that the auctions of vegetables take place. The space round the walls inside the building is apportioned off into stalls or shops, where meat and poultry, tobacco and sweets, cooked food and a varied assortment of drinks, are vended. The cleaning up of this building is perfunctory in the extreme, and the atmosphere is unpleasantly odoriferous. Outside, twice a week, the western portion of the large Square is covered with the stalls, benches, and wagons of produce-dealers, second-hand clothes and furniture dealers, poultry and egg merchants, and hawkers of other varieties of goods. These sell their wares to the passing public with the usual haggling and bargaining. To the east of the market house a huge concourse of cheap-jack auctioneers (with here and there a better-class dealer of fancy articles, or such like), with all manner of devices to attract attention, swarm the Square, some transacting business under a huge umbrella, some mounted on rostrums or wagons, selling every variety of stuffs and made-up goods. Many of these materials are of a decidedly cheap and nasty description, but it is not uncommon for beautiful goods to be obtained on the Square at absurdly small prices. This species of competition has from time to time been furiously resented by the big shops where rents are heavy and salaried staffs are kept.

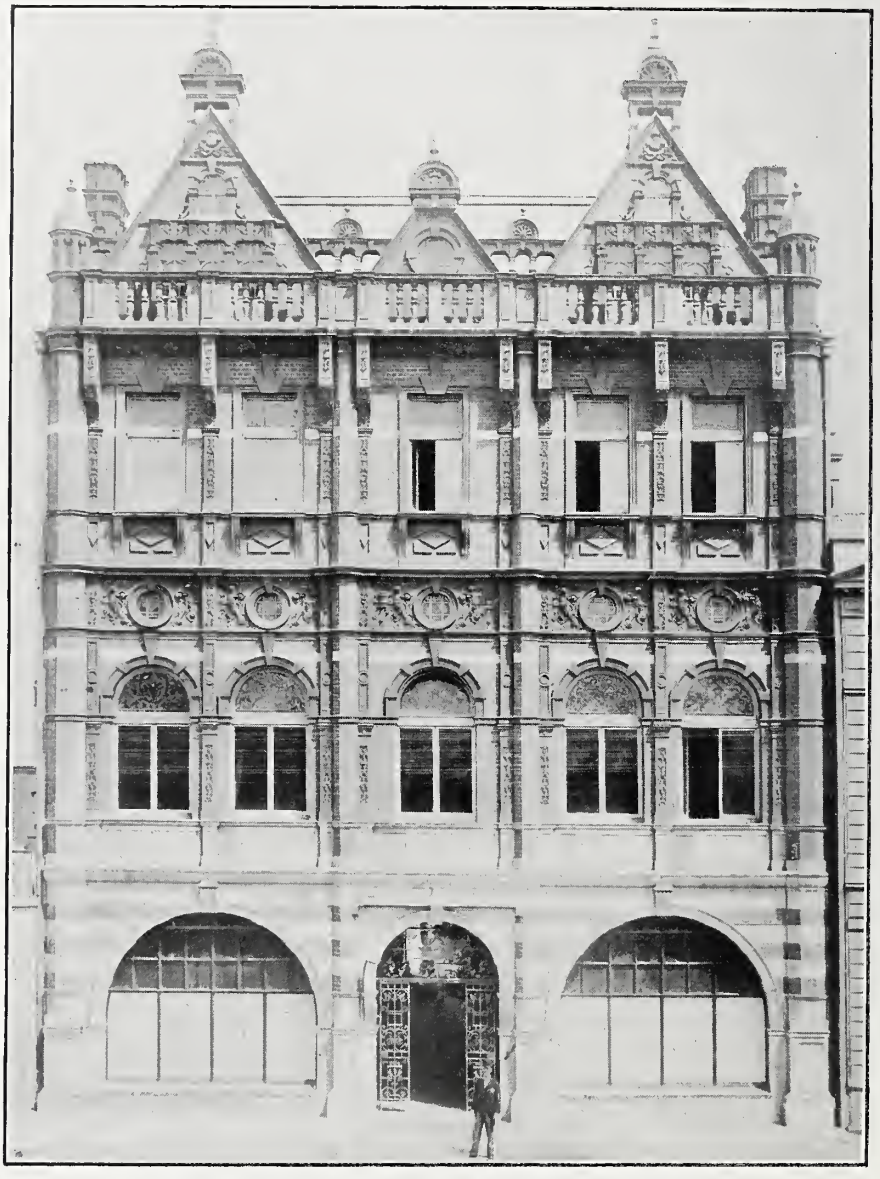
A corner of the MARKET SQUARE, JOHANNESBURG.

Police.—Johannesburg is policed by the same corps as Pretoria and the whole of the Witwatersrand. This corps is known as the Transvaal Town Police, horse and foot, and is controlled by the administration. The Johannesburg section consists of a Deputy Commissioner with two Assistant Commissioners, two inspectors, and nine superintendents of the foot police; one superintendent, 15 sergeants, and 73 troopers of the mounted section; and 74 sergeants, 560 constables of the foot section; 86 native constables. The traffic in the town of Johannesburg—considerably congested at various points in parts of the business day—is well regulated on the whole, the streets are orderly, and very few complaints are heard about the conduct of the police, who, as a body, contrast most favourably in efficiency and courtesy with the town police of the former days of the South African Republic.

The Fire Brigade.—The Johannesburg Fire Brigade arrangements are controlled by the Municipality, but the Brigade receives a money grant from the Government, in addition to the funds set apart for its upkeep by the town of Johannesburg. The Fire

PRITCHARD-STREET, JOHANNESBURG.

Brigade existed before the war under the control of the Staatsraad. After British occupation it was taken over with other municipal responsibilities by Major O'Meara, the military representative of the Burgomaster. Major O'Meara and his nominated Council of twelve appointed Mr. R. Gordon Stuart—who has many years experience of fire brigade work in the United Kingdom—to be chief of the Johannesburg Brigade, a position he has filled ever since. The efficiency of the Fire Brigade service since this has been enormously increased, both as regards the training of the men and the appliances used. The latter are of the most modern and approved type, supplied by the best-known manufacturers of fire-preventive appliances in Europe and the United States. The Johannesburg Brigade is only for service within the municipal area, and when a call is received from an outside district the Brigade must receive formal permission to proceed beyond the municipal boundary. The quarters of the Brigade are temporary, and some time will elapse before the permanent stations and quarters are built and equipped in accordance with the scheme suggested by Mr. Gordon Stuart. The central station is in Von Brandis Square, where the Government has apportioned a section for this purpose, in the north-west corner of the Square, which the Municipality has purchased at a valuation. Here a permanent station and single and married quarters for the men of the Brigade will be erected. The scheme will include four branch stations, situated north, south, east, and west, within the area to be protected. These stations will be placed in charge of a responsible officer appointed by the chief officer, and connection will be established with the central station, so that assistance can be provided from headquarters if necessary. The only one of these supplementary stations yet established is that of the eastern district, which is located in Commissioner-street East, Jeppestown. This is said to be the finest fire station in South Africa, and the most completely equipped. The quarters for both single and married men are excellently planned. Twelve men under a district Superintendent are accommodated there. The other branch stations will be in Parktown (north), in Fordsburg (west), and in one of the southern suburbs. The Fordsburg site was presented by the Government. At the central station accommodation will be provided for 36 officers and men, for the necessary workshops, and for a gymnasium and recreation room for the firemen. There are 55 members of the Brigade—a smart, well-officered body of men—recruited from all classes of the community. It included (at the time of writing) sailors, soldiers, men from fire brigades in the United Kingdom, engineers, coachmen, hotel-keepers, prospectors, fitters, and one despatch rider. The ranks consist of officers, foremen, engineers, first, second, and third-class firemen, and probationers. The salaries of the firemen range from £14 to £18 per month, engineers receiving £20, and foremen £25, per month, with quarters. There being no pension attached to service in the Brigade, the Municipality insures members for £500 in the case of death or total disablement, and £250 in case of partial disablement, incurred while on duty. The plant of the Brigade includes steam fire-engines, chemical fire-engines, automobile and horsed combinations, automobiles, one galloping ambulance, tenders, steamer, storevan, trolley, fly, ladder-cart, hose-carts and wagon, 42,750 feet of hose, complete sets of pompier ladders, 45 Gamewell street fire-alarm boxes (of which 14 are private), combination escape tender water-tower, turntable escape and water-tower. Twelve horses employed are the pride of the Brigade, and one of the sights of Johannesburg. The Brigade plant has been supplied by local manufacturers. Stringent regulations protect the public in theatres and public buildings, which have to be provided with proper means



CHAMBER OF MINES, MARKET-STREET,

Architects: Leck & Emley, Johannesburg.

of assistance and exit in case of fire; and all new business premises and hotels, houses, or stores have to submit plans of building for approval to the Council, and satisfy it that proper precautions will be taken to avoid catastrophe from fire. Reed thatches, so picturesque and restful in a scorching country, are no longer allowed to be used within the municipal area. The number of buildings in Johannesburg reported by the chief officer of the fire Brigade as fitted with first-aid fire appliances at the close of 1905 was 77, and included the Chamber of Mines, His Excellency the High Commissioner's residence, the Public Library, the Law Courts, the Municipal Offices, the General Hospital, the General Post Office, Park railway station and the railway goods yard, police stations and quarters, the principal banks, all the theatres, many hotels and clubs, and a large number of residential and business buildings. Hydrants have been fixed in the streets wherever possible, as the laying of mains for the suburbs under the new water scheme progresses, and street call-boxes are placed in every convenient position, including many of the public institutions and buildings, such as the residence of the High Commissioner, the Public Library, etc. The total number of fires attended by the Brigade during the year 1905 was 152, four being the largest number occurring in any one day. Only four deaths took place owing to fire, at conflagrations attended during that period by the Brigade. Accidents were remarkably few, some 12 members only of the Brigade receiving injuries in the execution of their duty. The damage to property amounted to £73,279, covered by insurance to the extent of £1,303,827. The distance travelled by horses and machines was 854 miles: 80 chemical charges were expended, and 640,470 gallons of water, while 32,756 feet of hose were in actual use. The Brigade is recognised as being thoroughly efficient, reliable, and well-equipped, and needless to add is exceedingly and deservedly popular in the town. Firemen, engineers, and foremen get four and five weeks' leave during the year, and may allow their leave to accumulate for three or four years, so as to enable them to take a trip to Europe if desired.

Sauers Buildings, Loveday-street, Market Square, Johannesburg.

Architects: Leck & Emley, Johannesburg.

Lighting.—The lighting of Johannesburg had, up to the commencement of 1906, never been entirely satisfactory, and many suburbs were at that period still waiting for connection with the municipal electric lighting system. An interesting account of this branch of municipal work was drawn up by the town statistician in a paper prepared by him and read before the members of the British Association who visited Johannesburg in 1905. No street lights were provided by the Sanitary Board in the early days, but in 1890 the Board decided that bars and hotels must supply lamps outside their premises to light the streets. A concession had been granted in 1888 to some persons who undertook to light the town with gas, and this included a grant of land west of the town, in what is now the suburb of Fordsburg, for the gasworks. These works still remain, and are used for a light and power station by the present municipal authorities. The whole plant and all material required for the gas concession's contract had to be transported from Aliwal North, Cape Colony, where the railway then terminated, to Johannesburg by bullock wagon. This effort so exhausted the resources of the concessionaires that the undertaking ended there. In 1889, however, another concession had been granted for lighting the town by electricity, and in 1891 the Johannesburg Lighting Company, Limited, was formed, to take over the concessions and assets of these two moribund concerns. In 1892 both lighting methods were being used, but financial troubles again beset the enterprsie during the slump of 1892-1893, and it was with the utmost difficulty that the concession struggled along. A former member of the enterprise thus described the position:—"The electric lighting of the town was started with a second-hand Marshall engine and a Brush dynamo placed on a mud floor in the corner of a shed erected for gas purposes while the hundred gas lamps in the streets required by the terms of the gas concession were lit." This struggling existence was terminated by the purchase of the entire amalgamation by the Sanitary Board in 1895 for the sum of £160,000,

which included concessions, plant, and site. Since the war a new system has been organised, which is becoming equal to the requirements of the town.

LOWER COMMISSIONER-STREET (Carlton Hotel on left).

The gasworks supply about 35 million cubic feet of gas, of which about 20 per cent. is lost in distribution. There are 32 miles of main, and the number of connections has never reached 500. The power and lighting station for the electric tramways and lighting system has been erected alongside the gasworks. A sum of £1,540,448 was allocated to the new tramways and lighting, and it is expected this will be sufficient to complete the scheme. The reduction in cost of the light supplied to the public will be very great.

Sanitary System and Drainage.—The sanitary service of Johannesburg, as, indeed, are those of nearly all South African towns, is primitive and unsatisfactory, resembling in this respect many country places in Europe, but no town of the size of the Rand capital anywhere. The "bucket" system is still in general use, and is a fertile source of contamination and inconvenience. Slop-water is conveyed in tank carts to "intake stations," where it is pumped or led by gravitation to depositing sites. Rubbish is collected in carts and conveyed to refuse destructors or dumping grounds. The difficulty of securing native labour for this species of work, and of obtaining sites on which to deposit uncleanly matter at a reasonable distance from the town, becomes daily greater, and the expense involved is enormously in excess of any advantage gained from so unsatisfactory a service. The unavoidable employment of the careless native in the scavenging department aggravates all the worst features of the system. In 1895 the Town Engineer of Johannesburg prepared a sewerage scheme which was recommended by three experts. Not having complete local governing power, the Staatsraad of that period was unable to adopt it. In 1898 the Staatsraad again took up the matter, calling for tenders from private firms prepared to submit and carry out a complete system of sewerage. The Government of the South African Republic, however, intervened, and stated its intention of taking the matter under its own control, so that the action of the Staatsraad proved once more abortive. In the same year the Government propounded its scheme of entering into an agreement with Mr. Emanuel Mendelssohn for a sewerage scheme for Johannesburg, and a resolution by the Executive Council authorised the Burgomaster to sign the agreement on behalf of the Government. For various reasons this decision was very unpopular with the Staatsraad and with the public, and so much opposition ensued that the agreement was withdrawn. After the war the nominated Town Council of Johannesburg invited an engineering expert in the employ of the British Admiralty to accept the position of Town Engineer. This gentleman prepared for the approval of the Council a gravitation water-borne system of drainage, and in 1903 the plans were accepted, with a supplementary scheme for surface storm-water drainage in conjunction with the sewerage scheme. Although costly

LOVEDAY-STREET, JOHANNESBURG.

in preparation, an enormous saving will be eventually effected by the introduction of these schemes. The effective dealing with storm-water drainage will save infinite expenditure on roadways and streets. The estimated cost of the sewerage service will amount to £1 3s. per head of ratepayers per annum, as against an approximate of £6 9s. per head per annum under the old inadequate system, thus showing a saving of £5 6s. per head per annum. The southern and south-western districts of the town, carrying the densest number of inhabitants, will be dealt with first; and towards the end of 1906 the town itself and many of the nearer suburbs should be adequately placed under a satisfactory system of sewerage and drainage.

Trades and Industries.—The main industry supporting Johannesburg is of course the gold mining, but within the municipal area certain other industries have been established and are carried on. There are three breweries, a match factory, two cigarette factories, and a macaroni factory. Flour-milling and baking are carried on extensively, iron and brass founding is pursued, brick and tile manufacture is extensively engaged in, the tobacco grown in the country is prepared and placed on the market, and printing, book-binding, and lithography also employ many artisans. There is a considerable amount of timber-working, and several private firms manufacture many special lines of their stock in this direction. There is a dynamite and explosives factory outside the municipal area which supplies large quantities of blasting material to the mines. The value of products manufactured in Johannesburg, exclusive of explosives, is upwards of £3,500,000 per annum. Wages and hours of labour on the Witwatersrand are apt to appear advantageous to people resident in other countries until compared with the cost of living. There are 21 Trades Unions on the Rand—a growth of recent years. Before the war a Building Union existed, which embraced all trades concerned in building operations, but in January, 1902, this society expanded into a Trades Council, and the number of unions thence increased from three to twenty-one. Over 7,000 members were contributary to the upkeep of the Trades Council at the commencement of 1906. The Trades Council offices and those of the unions are in a block of premises denominated the Trades Hall (situated in Commissioner-street), where there is also accommodation for a Workmen's Club and other branch associations. Some trades are very much more largely represented in their unions than others. Shop assistants have not yet formed any organisation in Johannesburg, and few definite statistics can therefore be supplied as to their hours of employment and wages received. The latter may necessarily be taken to vary extremely. The following table of wages and hours represented approximately the state of trade on the Rand at the beginning of 1906:—

Trade.	Rate of wages.	Hours of labour.	State of trade.
Bakers	90s. per week.	60 hours per week.	Bad.
Boilermakers	20s. per day.	48 hours per week.	Fair.
Bookbinders	115s. per week.	48 hours per week.	Bad.
Bricklayers	22s. 6d. per day.	8 hours per day.	Overcrowded (over 300 men out of work).
Carpenters	2s. 6d. per hour.	48 hours per week.	Very bad.
Compositors	115s. per week.	48 hours per week.	Very bad.
Coopers	19s. 2d. per day.	48 hours per week.	Fair.
Engineers (mines)	120s. per week.	—	Fair.
Engineers (railways) ...	2s. 6d. per hour.	48 hours per week.	Fair.
Engine-drivers	20s. per day.	48 hours per week.	Bad.
Electricians	20s. per day.	48 hours per week.	Fair.
Firemen	20s. per day.	48 hours per week.	Bad.
Ironfounders	120s. per week.	51 hours per week.	Quiet.
Linotype operators	140s. per week.	45 hours per week.	No demand.
Machine-minders (printing)	115s. per week.	48 hours per week.	Dull.
Miners	25s. per day.	10 hours per day.	Fair.
Painters	110s. per week.	48 hours per week.	Fair.
Plasterers	22s. 6d. per day.	48 hours per week.	Bad.
Plumbers	20s. per day.	48 hours per week.	Dull.
Stonemasons	3s. per hour.	48 hours per week.	Very bad.

Tailors' assistants work by contract, on the piece-work system. It is therefore impossible to give special statistics regarding their hours of employment. Hairdressers' assistants have very irregular hours of work, and are often paid on the commission principle. Waiters have no union, neither have grocers' assistants or drapers' assistants. Their salaries may vary from £15 to £50 per month. Women assistants receive from £3 to £15. Salaries of waitresses in tea-shops and restaurants (of which there are a very large number in Johannesburg) vary from £6 to £10. Domestic servants get from £4 to £8 per month; coachmen and gardeners (of whom very few Europeans are employed) receive from £7 to £12 per month.

The fine building of The National Mutual Life Association of Australasia, Ltd., Rissik and Market-streets.

Architects: McIntosh & Moffat, Johannesburg.

Cost of Living.—The ordinary rent for a cottage in Johannesburg is from £5 to £10 per month, while the rate for a room is from £1 10s. to £5 per month. Miners can generally rent a small corrugated-iron room on the mine at which they work for 10s. per month. Ordinary necessaries of life purchased at retail are on the following basis:—Bread, 6d. per lb.; moist sugar, 4d. per lb.; loaf sugar, 6d. per lb.; frozen meat, 10d.; fresh meat, 1s. 2d. per lb. Potatoes can be obtained at from 10s. to 25s. per bag of 160 lbs., or by retail at from 4 lbs. to 7 lbs. for 1s. The rate for poultry averages from 3s. 6d. to 5s. 6d. for fowls and ducks; eggs average 3s. per dozen, butter 1s. 3d. per lb. Green vegetables are expensive, as much as 9d. and 1s. 6d. per head being demanded for cabbages and cauliflowers at retail, although on the morning market auctions all kinds of green produce can be procured at prices that would be considered cheap even in the United Kingdom. To obtain vegetables at this price, however, entails purchasing in large quantities, and also paying for hire of cartage from the market. Trolleys are available for this purpose at a rate of 2s. 6d. per two-mile trip. Dry onions are more expensive than potatoes; oatmeal is 6d. per lb., and mealie-meal, from which excellent porridge can be made, is slightly cheaper. Fruit of certain kinds may be procured in large quantities at small prices in special seasons, but it is not always easy to find persons from whom it can be thus obtained, nor to arrange for the transport. What may be surprising to Europeans who know not their South Africa is that fruit is very expensive in Johannesburg when sold by retail, and quite beyond the reach of ordinary households, making an exception, perhaps, in the case of bananas and peaches. The latter fruit is, in the Transvaal, very inferior unless specially cultivated. Tinned goods, on which the population of the Transvaal has to depend to a very great extent, are very dear. Fresh milk is retailed at 6d. and 9d. per bottle containing barely 1½ pints; condensed milk is sold at 6d. and 9d. per tin.

The mines working within the municipal area are the City and Suburban, the Village Main Reef and the Village Deep, the Crown Reef and the Crown Deep, the Ferreira and the Ferreira Deep, the Henry Nourse and the Nourse Deep and South Nourse, the Jumpers and the Jumpers Deep, the Jubilee and the Jupiter, the New Goch and the New Heriot, the Meyer & Charlton, the Bonanza, the Lark Syndicate, the Klip Deep, the Kimberley Main Reef, the Wemmer, the Wolhuter, the Worcester, the Salisbury, the Spes Bona, the Paarl Central, the Rand Central Ore Reduction Co., the Robinson Gold Mine, the Robinson Deep and the Robinson Central Deep, the Langlaagte Proprietary, the Langlaagte Royal, the Langlaagte Deep, Llanglaagte Estate, and Langlaagte Block B. The value of these mining properties and that of the Witwatersrand Native Labour Association, and some other plots of mining ground, has been assessed by the Municipality at £1,196,194. This includes the buildings, but not headgear and machinery, or mineral values. These mines employ over 6,000 white workmen, 35,390 natives, and between 7,000 and 8,000 Chinese. The farms on which the Golden City has been laid out are Randjeslaagte, Doornfontein, Braamfontein, Cyferfontein, Klipfontein, Turffontein, Zandfontein, Waterval, and Langlaagte.

ELOFF-STREET, JOHANNESBURG.

The Town Council of Johannesburg had, at the beginning of 1906, several comprehensive schemes on hand for which loans had been raised. These schemes will result in increased comfort and cleanliness throughout the municipal area, and also in a substantial diminution of the rates. The most important of the schemes is the installation of a complete sewerage system for the town and suburbs, at a cost of over £400,000. The main difficulty in dealing with a sewerage scheme for Johannesburg is that the centre part of the town lies high, with the suburbs falling away on all sides. It is therefore impossible to bring all sewage matter to one main outfall, and the town has to be drained in sections, and an outfall planned and the outfall area acquired for each section. How to amalgamate the systems as much as possible was one of the problems facing the authorities when this was written. The south-western district, which is the most populous, is the first of these sections to be dealt with, and a sewage farm is to be established at the outfall. The outfall for the south-eastern district will be treated by the bacteriological process. One or both of these systems was estimated for completion in the course of the year 1906. The storm-water drainage conduit pipes were to be laid in the same trenches as the sewerage pipes, to avoid undue disturbance of the roads. This is a distinct innovation. The lighting and electric tramway schemes are worked conjointly. The main generating station is situated in Fordsburg, on the site of the old gasworks. The scheme includes an entirely new gas plant installation. The current for the electric trams and lighting is generated by gas engines, the plant being of sufficient capacity to supply the whole of the town and

suburbs. At the beginning of 1906 many of the big buildings and dwelling-houses had already been connected with the new system. There are 52 miles of tram-track to be served, the system of traction being the overhead trolley wire. The works include a large car shed to contain 115 cars. One hundred cars will be kept running. The first section of the new light and tramway system was started in February, 1906, with steam plant supplying and distributing over 2,000 kilowatts. A new station fitted for 13,000 horse-power in gas-driven units was in contemplation, the buildings altogether to be capable of accommodating engines of additional 4,000 h.p. The complete staff of motormen and conductors to be employed on the tram system was to number 320. The tramway concession expropriated by the Town Council, for a sum of £150,000, was granted to Mr. Sigmund Neumann in 1889, and was eventually ceded to the Johannesburg City and Suburban Company, Ltd. In February, 1891, this Company opened up 4½ miles of tramway, which was subsequently extended to about twelve miles. The trams were of horse traction, tariffs had to be submitted for Government approval, and the Government reserved the right to order such extensions of the service as seemed desirable. The minimum fare was fixed at 3d. Mails had to be carried if required, and the Government had rights of expropriation. Subsequent to the war, the British Government recognised the concession, and ordered the renewal of the service, which was, however, totally inadequate to the growth of the town. The Company had been refused permission by the late Government to transform itself into an electric tram company, on the ground that the horse service was of use to the farming community by providing a constant market for forage. The electric service, inaugurated in February, 1906, was intended to supersede the horse service by gradual degrees as the new system was brought to completion.

The water supplies of the Rand have been expropriated by the Government and placed in the hands of the Rand Water Board. This important body, in which the Government, the mines, and the Municipality are represented, has elaborated a scheme by which Johannesburg takes over and distributes an amount of water sufficient for the supply of the town area. A special rate will be levied to connect the more distant suburbs with the town supply. The water question was a very serious one in the early days, consisting in merely surface supply and private wells, both liable to contamination, as the only sources from which water could be obtained. Water contained in barrels drawn by horses through the streets was sold to the early Johannesburg settlers, and tales still survive of a water famine during which the then "Raudlords" luxuriated in baths of three bottles of soda water at half-a-guinea a bottle. In 1887 Mr. (now Sir) J. Sivewright, of Capetown, obtained permission from the Government of the South African Republic to supply Johannesburg with water. The agreement gave the right to lay pipes through the streets, and to form the Johannesburg Waterworks, Estate, and Exploration Company, Ltd. No monopoly was conferred. The price to be charged to the public was limited to 4s. per 100 gallons, and no obligation to supply was imposed. Mr. Sivewright had secured the portion of the farm Doornfontein on which a fine water supply was available, and held it on a lease which only conferred the right to use it for the purposes of the town water supply. Large dams and reservoirs were constructed there. The demands of the town for more and better water were the subject of action by the Staatsraad of Johannesburg and the Volksraad of the State, but no definite action was taken. In 1898, Mr. David Draper, of Johannesburg, made the discovery of a large underground storage of water in the dolomite formation at Zuurbekom, within a few miles of the town. Messrs. Mendelssohn & Bruce, of the *Standard and Diggers' News*, became possessed of this property by concession, and sold it to the Waterworks Company, which was largely controlled by the house of Barnato Bros. The Rand Water Board expropriated these concessions and properties in 1905, together with the Parktown water towers and supply belonging to the Braamfontein Estate Company (controlled by Eckstein's) and another big water property also held by Eckstein's, a catchment area at Vierfontein—on which dams had been built and large sums of money expended—and also the supply of water at Wonderfontein, in which the second Mayor of Johannesburg (one of the pioneers of the Rand) was largely interested. Part of the scheme was in working order by March, 1905, and the price of water was immediately reduced from a minimum of 12s. 6d. per thousand gallons to a rate of 6s., which rate may still be capable of further reduction.

RAILWAY STATION, JEPPESTOWN, JOHANNESBURG.

Public Health. Under the Town Council of Johannesburg the department of public health has assumed important proportions, and the advice of its officials receives careful consideration on all occasions. These officials are given extensive powers, and the Rand capital enjoys increasing immunity not only from epidemic diseases, but from enteric fever and

pneumonia, which in the early days were responsible for so appalling a death-rate. As a result of the representations of the Medical Officer of Health many foreing-beds for disease have been uprooted, and proper supervision exercised over the public and private compounds and locations in which the coloured races live. To the zeal displayed by this department Johannesburg owed the prevention of a serious spread of the bubonic plague epidemic that visited the Rand in 1904, and development of an outbreak of smallpox that occurred in 1905. Both were speedily checked, and, although the proportion of deaths to cases was large, the latter were limited to a comparatively small number. The bubonic plague appeared in the pneumonic form, breaking out in the coolie location at Fordsburg, where Asiatics of all descriptions herded in a disgusting state of overcrowding and filthiness. The outbreak was traced to the importation of infected rice from Bombay which was handled by an Indian trader in the location. From the prevalence of pneumonia in Johannesburg, many cases of plague must have passed unnoticed before official cognisance of the presence of bubonic plague. The date of this was on the 18th March, 1904. By March 25th no fewer than 65 cases had been recognised, of which 55 proved fatal after an illness of two or three days. This form of plague was recognised by the medical profession on the Rand as of the most dangerous character. Since that period pneumonia has been included in the list of notifiable diseases. The smallpox epidemic also assumed a peculiarly virulent form, unvaccinated persons suffering most severely. No cases occurred amongst either European or coloured persons who had been recently vaccinated, and the deaths among persons vaccinated in childhood were few. European cases predominated, and the deductions made from general observation of the outbreak were a triumphant vindication of the theory of immunity through vaccination. Very wide improvements in the sanitary conditions of Johannesburg have been introduced, but it is manifestly impossible to place public health matters on a proper footing until the sewerage scheme is in working order throughout the municipal area. The number of deaths of Europeans from dysentery and diarrhœa occurring within the Johannesburg municipal area during the year ending June, 1905, was little more than half that of the corresponding period of the previous year; from enteric fever little more than one-third; and from pneumonia, less than three-fourths. Condemnation by the Medical Officer of Health, and the almost coincident outbreak of plague, induced the destruction of the old coolie location, which was burnt to the ground, and a large space, familiarly known as the "insanitary area," expropriated and re-modelled. This quarter is now known as Newtown.

VIEW IN JOUBERT PARK, JOHANNESBURG.

Public Spaces.—Public spaces and recreation grounds in and around Johannesburg appear few in number, and of no great extent, yet there are in reality many open spaces, although these cannot be considered by any means to be sufficiently numerous to supply the needs of the growing population. The central town, indeed, may be said to be badly served in this respect, the bulk of the spaces being found in the suburbs. Of the three squares in central Johannesburg, Government Square, Plein Square, and Market Square, the first-mentioned (round the Law Courts) is the property of a syndicate which contemplates covering it with buildings. The second, near Park Station, has erected upon it the temporary premises of the municipal offices, the old telephone tower, and a temporary structure used as the Technical Institute. The third, up to the middle of 1906 monopolised by an unkempt, uncleanly market, is to be occupied by Government and municipal buildings. The Union Ground, in close proximity to the railway, and a short distance up the line from the central station, is a dusty piece of land planted round with gum trees, where schoolboys and Kafirs congregate and play indiscriminately, and where occasional inter-school and inter-league matches are contested by boys of older growth. It is neither a lovely nor a wholesome spot. Gipsy Smith, the revivalist preacher, when holding his meetings in Johannesburg, was allowed to pitch his tent on the Union Ground. Ottoshoop Park, Doornfontein, is another neglected spot. Joubert Park (a railed space enclosing about 40 acres) situated between Hospital Hill and the railway line, lies on a gentle slope, and is a charmingly-laid-out public garden, with a variety of plants, flowers, and trees, artificial pond and fountain, lawns, and gravel walks. It is frequented by nurses and children in the mornings, and twice a week the band of the Town Police or of the South African Constabulary plays there for a couple of hours in the afternoon. The Doornfontein Park is a narrow strip running north and south for half the length of End-street, which separates Doornfontein from the central town and Hospital Hill. It is divided into four by the intersection of the railway and two streets, and is prettily laid

SPORTS ON THE FAMOUS WANDERERS' GROUNDS, JOHANNESBURG.

Photo: Dunn Bros., Johannesburg.

out in the same style as Joubert Park, but has no water. There are public tennis courts and seats for visitors, but it will be some considerable time before the trees grow to any size. The Milner Park is a recent acquisition, and as yet presents no attractions to the public. It comprises 260 acres to the north-east of Braamfontein, and it is proposed to spend a large sum on laying it out. It was presented to the town by the Government during Lord Milner's term of office as High Commissioner. The Hermann Eckstein Park was presented by the Braamfontein Estate Company, which is practically Wernher, Beit & Co., Ltd. The park is situated in the Company's beautiful estate of Sachsenwald, and the site has an extent of 210 acres. It

HIGH COURT BUILDINGS, Fox and Joubert-streets, JOHANNESBURG.

Architects: McIntosh & Moffat, Johannesburg.

was established as a condition of the gift that the space was to be laid out as a public park and to be called after the late head and founder of the Johannesburg house of Eckstein & Co., and the nucleus of a zoological collection to be housed in the park was presented with it. Five acres have been set aside as a seedling-tree nursery. Jeppe Park, in Jeppestown, has lately been re-modelled. The Oval, also in Jeppestown, is an enclosed garden of a shape indicated by its name, where is erected a monument to the late Mr. Jeppe, father of the two well-known Rand gentlemen of that name. It was laid out in 1896, and, like Jeppe Park, has been re-modelled. Troyeville Park, six acres in extent, has been taken over by the municipal authorities and re-planted. The City and Suburban Park, in the dusty and unsightly township of that name, is likewise in course of being laid out, and the Rotunda, in Turffontein, is another reserve which is in the hands of the Municipality. This park embraces ten acres, and will be tastefully planted and designed. In nearly all the new suburbs, spaces have been reserved for public gardens or parks, and in due time, and as funds permit, they will be taken over by the municipal authorities and placed in the hands of the Superintendent of Parks. The Johannesburg race-course is the property of the Turf Club, which is organised under the jurisdiction of the Jockey Club of South Africa. This course is between two and three miles distant from the centre of the town, in the suburb known as Turffontein. The course is one mile seven furlongs, while the area of the property is 150 acres. The race-course is also used by the Johannesburg Pony and Galloway Club, the meetings of the latter body being far more numerous than those of the Turf Club. The course is well kept, but not picturesque, and the road to it is indescribably dusty. There is a race-course at Auckland Park, a beautiful, exquisitely-treed suburb, one of the favourite resorts for Johannesburg on holidays. This course is used for race meetings which take place fortnightly. At Auckland Park, the grounds of the old hotel—where all kinds of trees have grown to perfection, where there are winding paths and lawns, a lake, and weeping willows—are recognised as one of the prettiest spots within a drive of Johannesburg. The Wanderers' Club owns a large enclosure between Park station and Wolmarans-street, which is an extremely valuable property of thirty acres. On this property a building has been erected containing two halls, other rooms, and the necessary offices. Subscription and charity dances, public banquets, political meetings, theatrical entertainments, Sunday night concerts, the meetings of the Guild of Loyal Women, bazaars, receptions of the Ladies' Calling Club, and many other functions too numerous to mention, are held in the building. Of historic events transacted here, it may be interesting to recall the meeting between President Kruger and the uitlander community in 1890, the great meetings of the South African League (one of which was dispersed by an armed force of police), in the stormy years succeeding the Jameson Raid, the banquet to Lord Kitchener on the conclusion of peace, the reception of Mr. Chamberlain in 1903, and the mayoral reception of the members of the British Association in 1905. In ordinary times the large hall is used as a gymnasium or a skating rink. The grounds are reserved for sports, ten lawn tennis courts being laid out. Athletic and sport contests of every description are held here. The first English team to visit the Transvaal played two cricket matches at the Wanderers' Ground in 1888, and since that time all important matches played in Johannesburg have taken place at the Wanderers' Ground. There are more than a thousand members, and the Club is very wealthy. The golf links are situated on the Houghton Estate, beyond the old Pretoria main road, and within a stone's throw of the Sunnyside property. It is a pretty spot, but unsheltered and windy. There is a good club house, and the game is, as usual, highly popular. The property is owned by the Consolidated Investments Company. Besides the links, there are in Yeoville, Berea, and various other suburbs, spaces laid out for tennis and other games, which are leased and used by clubs and groups of private persons, for tennis, hockey, cricket, and other recreations, and where afternoon entertainments are given. The Agricultural Show ground, and a piece of Government land adjoining the Johannesburg Prison, are

to be handed over to the municipal authorities. Together they will form a substantial addition to Milner Park.

Compounds and Locations.—A distinctive feature of South African towns consists in the compounds and locations where people of the native and coloured races are quartered when living within a municipal area. Johannesburg Locations are under the control of the Public Health Department, and are managed by a Superintendent of Locations. A compound is an enclosure where natives working for a specific purpose, for an employer, or an institution, are accommodated. Thus mines, large works and factories, and the Municipal Councils of all the large towns have compounds in which to house their native employés. A location is an area within which natives who have daily employment in the town may reside, with their families, and erect houses if desired. Natives are not supposed to live in the same location as Asiatics, but breaches of this regulation have been common. Since the compulsory destruction by fire of the coolie location after the outbreak of plague, a large area some twelve miles from Johannesburg has been acquired by the Town Council where properly separated locations for Asiatics and Kafirs have been laid out. Plots of ground and dwellings will be leased or sold, ground for cultivation may be acquired, an early train service is to be run for the convenience of vegetable-hawkers and others who earn a livelihood in the town, and public places will be set apart where native washerwomen can pursue their occupation under cleanly and sanitary conditions. Shop and eating-house licences will be issued in the location to such as wish to take them out. The site for the new location is called Klipspruit. The advantage to the town in setting apart these two locations and so large a number of the mixed coloured races cannot be overestimated. The mines compounds, in some instances, and many of the private compounds of business enterprises within the municipality, have often been ill-found and insanitary; and in many respects the conditions and accommodation provided for South African natives on the Rand contrasts most unfavourably with elaborate arrangements made for imported Chinese labourers.

Scholastic Establishments.—There are many private schools in Johannesburg, the largest being the Marist Brothers' School for boys, which has upwards of 600 scholars. S. John's College for boys, S. Margaret's High School for girls, and S. Mary's College for girls in Jeppestown—the oldest school within the Johannesburg area—are Church of England establishments. The Roman Catholic community have four convent schools for girls, and there are a large number of Dutch schools under both private and Dutch Reformed Church management. There is a branch of the Roedean establishment for girls in Parktown, and a Parktown private school for boys, both of a superior class, and two very good German schools in different parts of the town. A large number of private ventures controlled by ladies, and one or two under men, exist in various quarters of Johannesburg, in addition to the five Government secondary schools and upwards of two dozen Government elementary schools. In some of the orphanages a staff of teachers and a proper school establishment is maintained. There is a College of Music, and several dancing academies, where physical culture and calisthenics are carefully taught. There is a remarkable lack of artistic taste in Johannesburg, and artistic tuition is consequently somewhat second-rate.

PARK STATION, C.S.A.R., JOHANNESBURG.

Societies and Associations.—Of benefit societies and associations represented in Johannesburg the most important is naturally the Order of Freemasons. There are upwards of forty craft lodges of this Order in the town. The Good Templars, Oddfellows, Rechabites, Buffaloes, Foresters, and Irish National Foresters all have a large following, and there are a number of building and mutual assurance associations. Patriotic associations are well represented, of these the Caledonian Society being the most prominent. Others include the Cambrian, Irish, Transvaal Manx, Yorkshire and Lancashire, Cornish, Northumberland and Durham, Canadian, New Zealand, and Loyal Orange Societies. There are many scientific and technical societies and associations, of which the best known are the Chemical and Metallurgical Association, the Mine Managers' Association, the Medical Association, the South African Association of Engineers, the Mechanical Engineers' Association, the Mine Surveyors' Association, the South African Association for the Advancement of Knowledge, the South African Expansion or Colonisation Society, the Geological, the Photographic, and the Philatelic Societies, the Society of Johannesburg Spiritualists, the Theosophical and the Philosophical Societies, the Johannesburg Field Naturalists' Club, and branches of the Transvaal Game Preservation and the Trout Acclimatisation Societies. There are several literary and debating societies, and two or three musical associations. Of

sporting clubs and institutions there is no lack in the "Golden City." A branch of the Jockey Club of South Africa, the Turf Club, the Johannesburg Pony and Galloway Club, the Auckland Park and the Sanssouci Racing and Sporting Clubs, the Wanderers' Club, the Waverley Coursing Club, the Johannesburg Harriers' Club, the Rand Polo Club, the Witwatersrand Kennel Club, the Rand Poultry Club, the South African Tattersall's, the Transvaal Automobile Club, and the National Sporting Club, may be mentioned. Two golf clubs, several athletic associations, cycling and motor-cycling clubs, numerous lawn-tennis clubs, cricket unions, leagues and associations, football unions and associations, with contingent affiliations, all find support and patronage in Johannesburg. Among the social clubs the Rand Club is the oldest established. There are also the New Club, mainly for business men, and the Athenæum Club, for Public School and University men and members of the Civil Service, which may be classed among the most important. The two first mentioned are in the business portion of the town. The Rand Club erected new and elaborate premises in 1904. The Athenæum Club, with a building in old Dutch style, is situated between the Hospital grounds and Joubert Park. It is the only Johannesburg club with special rooms for the entertainment of ladies. Other clubs are the Goldfields, the Reform, the Johannesburg, the German clubs (of which there are several), the French and the Italian Clubs, the Catholic Club, and the Church Club. The latter is under the ægis of the Anglican Church. There is a Workmen's Club housed in the Trades' Hall, with members belonging to the various trades unions of the Rand. A Burns Club exists which partakes both of a literary and a patriotic character. Of the political associations, the most important are the Progressive Association (distinctly British and Imperial), the local branches of "Het Volk" (a new Dutch party which has come into existence since the British occupation), and the Responsible Government Association (aiming at local government for the Transvaal). Several Ratepayers' Associations and Vigilance Associations have existence, to voice the interests of the public in regard to municipal matters, and a recently-formed body which takes an interest in all matters of public import is the Rand Pioneers' Association, to which is affiliated the Rand Women Pioneers' Association. Other women's societies are the Guild of Loyal Women of South Africa, which has an important branch in Johannesburg; the Jewish Ladies' Society and the Jewish Ladies' Communal Guild, the Ladies' Calling Club, and the Martha Washington Club, for American ladies. Religious communities having branches in Johannesburg are the Romanist Order of the Brothers of Mary, the Anglican Order of the Community of the Resurrection, the Ursuline Nuns, the Sisters of Nazareth, the Sisters of the Good Shepherd, the Sisters of the Holy Family, the Anglican Order of the Sisters of East Grinstead, District Sisters of the Wesleyan Mission, the Sisters of the Convent of S. Joseph, and the nursing Sisters of the Order of the Holy Family, who work at the General Hospital. Included in religious and similar organisations may also be mentioned a branch of the Young Men's Christian Association, the Young Women's Christian Association, the Boys' Brigade, the Band of Hope, and the Girls' Friendly Society. There is a Transvaal Society for the Prevention of Cruelty to Animals established in Johannesburg, which fills a decided want, and does much excellent work, but is sorely hampered in its operations for want of funds. Temperance work is also extensively supported in the town, many societies existing for the furtherance of this object.

THE NEW EMPIRE PALACE OF VARIETIES, JOHANNESBURG.

Architects: McIntosh & Moffat, Johannesburg.

Theatres and Music Halls.—The theatres of Johannesburg are largely patronised and usually crowded, although no provision is made in the nature of cheap seats for the poorer portion of the public. The oldest of the theatres in the town is the Standard Theatre, which was opened in 1890. It has accommodation for an audience of about 600. The other of the older theatres were the Theatre Royal and the Queen's, which no longer exist. The former was destroyed by fire some considerable time after the building had ceased to be used for theatrical purposes. The Gaiety Theatre, now termed the National Theatre, is the headquarters of the National Sporting Club, the members of which use the building for their entertainments and contests. It is also used by the Hebrew Dramatic Society, whose entertainments in the Yiddish tongue are held there on Sunday evenings. The Empire Palace of Varieties, the oldest music hall in Johannesburg, was at one time the Globe Theatre, but was remodelled for its present purposes. An elaborate new block, situated in Commissioner-street East (which was nearing completion when this was written), when taken possession of will give a distinct improvement in the *locale* of "The Empire," as it is usually termed. The entertainments provided for the public at the Empire are largely supported, and very popular

with a numerous class. His Majesty's Theatre was established after the war. It is situated in Commissioner-street, opposite the imposing premises of the Carlton Hotel. It has principally been used by musical comedy companies. There is no supply of South African actors, nor are there any stock companies engaged at any of the Johannesburg theatres. Touring companies are brought from Europe with a *repertoire* of pieces that have enjoyed popular runs in the United Kingdom. None of the Johannesburg theatres produce new or original pieces. The principal managers whose names are associated with touring companies brought out by them to South Africa are Messrs. Wheeler Bros., Messrs. Sass & Nelson, and Mr. Leonard Rayne. The last-named is the exponent of legitimate drama and melodrama, and takes leading parts in many of the plays he produces. So also does Mr. Nelson, whose line is light comedy. The Messrs. Wheeler undertake musical comedy productions almost exclusively. Under the auspices of these gentlemen some first-rate talent has appeared in Johannesburg, notably Madame Albani, Miss Margaret McIntyre, Miss Ada Crossley, Miss Kate Vaughan, Miss Genevieve Ward, and Mrs. Langtry; Signor Foli, Messrs. Santley, Lionel Brough, Edward Terry, Harry Nicholls, and the late Mr. Wilson Barrett. The celebrated tenor, Mr. Saunders, during his tour in the Transvaal in 1905, was courteously allowed the use of the Standard Theatre by Messrs. Wheeler Bros. It is much to be doubted, however, if the most exquisite talent is so attractive to the Johannesburg public as the musical comedy and the variety entertainment, if one may judge by the comparative attendance at the theatres.

The Fort.—The Fort is one of the historic buildings of Johannesburg, and occupies a commanding position above the town, on the summit of the Hospital Hill. Its existence began humbly enough, as a small gaol, of which the legend runs that it came to be looked upon as a home for life by burghers of the State whose debts or other troubles were too heavy a burden. Leave for the day, to see their friends or to attend to their affairs, was traditionally supposed to be freely granted to all but "uitlander" prisoners, while the dire threat of being "locked out for the night" was used to point the reminder not to be out beyond hours! After the disastrous Jameson Raid, and the assurance conveyed by Mr. Chamberlain that England would not go to war over the uitlander question, the gaol was converted into a fort for the intimidation of the disarmed uitlander community. With the assistance of supposed German "expert" advice, the structure assumed a quite formidable appearance, and two Krupp guns trained on to the town, supported by a garrison of the Staats Artillerie, caused quite as much foreboding in Boer as in British minds, as to what would happen should they eventually be brought into action. On the craven surrender of the town by the Boers without scarcely a shot being fired, the bogey of the Fort was laid for ever. It transpired, to the infinite diversion of the public, that the work of the supposed experts was such that the firing of either of the guns would have shaken the Fort to its very foundations, and that the boasted fortifications were of the most flimsy description. The Fort has been continuously used as a gaol, being the only State prison in the Johannesburg district. It has been most inadequate to the demands made on it in this respect since the resumption of civil administration and the increase of population, and painful scandals in connection with overcrowding, and the treatment of untried prisoners, which from time to time have reached the ears of the public, have helped to perpetuate the odious traditions attached to this edifice. During the continuance of hostilities, part of the garrison of Johannesburg was accommodated in, and camped round, the Fort. On the withdrawal of all the troops on the Rand to Krugersdorp, it ceased to have any military significance.

JOHANNESBURG STOCK EXCHANGE.

THE STOCK EXCHANGE.

"The market," in Johannesburg parlance, has no connection with fruit, vegetables, or forage. It concerns mineral, not agricultural, stock, and is a most important factor in the daily life of the Rand—a kind of moral barometer of the prosperity of the times. A good market is reflected in every face along the Rand; a slump is as faithfully recorded in the appearance, and often in the temper, of every business man from Springs to Krugersdorp. The market, its fluctuations and its possibilities, form an incessant and absorbing topic of conversation in the "Golden City," where the hopes of another boom such as made and lost many a fortune in the earlier days still springs eternal. In 1889 dealers in stocks and shares used a building in Commissioner-street for their operations which rapidly became inadequate to accommodate the rush of business and increasing number of brokers, in days of heavy share transactions and frequent booms. A new building with suites of offices was accordingly built on the same site, and the streets leading at right angles from Commissioner-street to Market-street, on either side of this building, were chained to prevent the passage of wheeled traffic.

"Between the Chains" (a familiar expression in Johannesburg), in Simmonds-street and in Fraser-street, outside operators conducted business, and here also men gathered to exchange news and political opinions, loafers and unemployed congregated, demagogues thundered, and patriots incited men to action with fiery, and often beery, eloquence. At the junction of Simmonds and Commissioner-streets was the old "Corner House," headquarters of the Eckstein interests, and in itself a gathering place for speculators and men of vast interests in the commercial world of Johannesburg. "The chains," though no longer in existence at this point, where Eckstein's huge modern building stands, deserve remembrance as being historically interesting and as having played a leading part in the stormy annals of Johannesburg. In the early days the Stock Exchange had no charter of corporation, and only existed by the action of the members. With the increase of business and number of members, however, and when the undertaking had assumed important proportions and the members represented large interests, its status was established on a proper footing. The charter was taken out in 1897. After the restoration of peace, the long-talked-of new Stock Exchange buildings were erected, on a site purchased for the purpose, the whole building being constructed at a cost of £160,000. "The chains" were removed from Simmonds-street, and a historic feature of Johannesburg disappeared. The new Exchange Buildings stand on Marshall Square, at the western end of Commissioner-street. They occupy an entire block surrounded by four streets. The foundation-stone of the structure was laid by Lord Milner in April, 1903. There are three floors and large base-

THE PARK, JEPPESTOWN, JOHANNESBURG.

ment accommodation, reading, writing, and billiard rooms, and a strong-room fitted with safes, for the use of members only. The building contains 210 offices. The Exchange is built of Transvaal stone. The hall, 90 ft. in length by 70 ft. wide, is divided by arcades of marble columns, with a visitors' gallery at one end. There are upwards of five hundred members of the Exchange, most of whom are proprietary members, and the entrance fee has been raised from one hundred guineas to five hundred guineas, with an annual subscription of twelve guineas. The dealings of the Johannesburg "market" have not always been such as to command respect. The gambling mania in the earlier period of the town's history rose to such a pitch that to earn a living by honest work seemed more or less of a hardship to men who had constantly before their eyes the possibility of a sudden rise to wealth without a stroke of real work. Many men toiled only to raise money to "plank it on the market"; companies, *soi-disant* mining concerns were created whose capital was used solely for speculative rather than for development purposes; brokers dealt largely themselves in the stocks they dealt in for others, and many failures, and in other cases failures narrowly averted through outside influence, have to be recorded as the result. At one time such irregularities as the dealing in syndicate shares as freely as the shares of established companies prevailed, but such transactions were eventually checked. The daily business operations of the Johannesburg Stock Exchange are enormous, and over two hundred stocks are quoted on the official list. These include not only gold, diamond, coal, and land properties, but of late many propositions affecting base metals such as tin, copper, mica, etc., have found favour in the eyes of the public, and have become a prominent feature of the Stock Exchange operations. The official list of stocks, even in the depressed conditions which existed throughout the whole of South Africa subsequent to the war and settlement, represented a value of upwards of one hundred millions sterling.

JOHANNESBURG HOSPITALS AND PHILANTHROPIC INSTITUTIONS.

Johannesburg Hospital.—The oldest of Johannesburg philanthropic institutions is the Hospital, situated on the rising ground, north of the railway line, known as Hospital Hill. The site, embracing twelve acres of land, was granted by the late Government for hospital purposes at the instance of some of the well-known inhabitants, and the first workers were sisters of a Roman Catholic community who still give their services to the institution. The original hospital as it existed in 1888 used tents for nursing purposes, and subsequently the present building was erected, and was added to from time to time as funds permitted, and as the need for more accommodation became urgent. A larger staff, as also a training ground for nurses, became desirable, and, while the sisters retained their original position and authority, a Nursing Superintendent and a staff of professional nursing sisters and probationers were appointed, under a resident medical officer, whose place of residence was erected in the hospital grounds. The rules of the institution have been so framed as to admit of the hospital being used by paying as well as pauper patients. In the early days, the "home" accommodation provided and attendance upon persons even of ample means was not such as to facilitate proper nursing through a severe illness, and a large portion of

the unmarried section lived in lonely rooms or in crowded buildings. In the days of scattered dwellings and little sanitation, death took heavy toll of the community, and Johannesburg owes a debt of gratitude to the first founders of the Hospital. There are in this valued institution at the present day upwards of 370 beds, about 93 of these being for natives. The late Barney Barnato presented the Barnato Ward, for three patients, and a new wing has lately been built with a contribution of £10,000 from the late Mr. Robert Stroyan. The Stroyan Ward adds 52 beds to the Hospital resources, and with its completion the overflow tents and huts in which patients had been temporarily accommodated disappeared. The foundation-stone of the Stroyan Ward was laid by H.R.H. Princess Christian, during her visit to Johannesburg in September, 1904. A new nurses' home has also been added to the building, and many other improvements and alterations have been effected. The establishment of a separate native hospital is occupying the attention of the Government. At present the natives treated at the Johannesburg Hospital are attended by the Roman Catholic sisters. These sisters have their special wards and work, and are under the supervision of the Superior of their Order, and not in any way within the authority of the Nursing Superintendent; but this dual arrangement has been productive of no trouble or disorder, and there are no better nurses than these sisters, who give whole-hearted interest in their work. At one time a number of chronic cases were retained at the Hospital, there being no institution where senile, paralytic, or other incurable cases could be dealt with. These have now been removed to a suitable shelter at Government expense. A bed established as a memorial to the late Mr. Paul Kruger was subscribed for and presented by some lady residents of the town. This, which is marked by a brass plate at its head, was opened by Mr. (late General) Beyers. There is also a bed given by the late Mrs. Kruger. Fees at the Hospital are 10s. per day, charged against those patients able to pay. Should the patient be attended by his own physician, or by a member of the visiting staff, surgeons' and physicians' fees may be charged. A board of ten members nominated by the Government transacts the business of the institution, and a resident Medical Superintendent is responsible for the management. There are also two resident surgeons and two resident physicians, in addition to a large visiting staff. The funds are derived from Government grants voted in the Legislative Council, fees from patients, and public subscriptions. The last Government grant amounted to £43,000. In former days the Government of the South African Republic set aside the district native pass moneys for the expenses of the Hospital, and this matter is now in dispute between the Hospital Board and the Administration. A Commission which sat recently to consider the financial relations of the Colony in respect of hospitals, main roads, and other public matters, recommended that the Government and the local governing bodies share these expenses between them. This recommendation, or a modified form of it, will in all probability be adopted. During the twelve months from July, 1904, to June, 1905, the total number of patients treated in the Johannesburg Hospital was 12,378, of which 7,919 were out-patients. Special arrangements are made at the Hospital for cooking the food of Jewish persons and Asiatics. The daily average of beds occupied during the year was 323, the greatest number yet noted, and extreme difficulty was experienced in finding accommodation for all cases. The maximum number of indoor patients treated in one day was 350. The work of the Hospital increases very rapidly, and a corresponding increase in the accommodation is urgently needed.

THE CORNER HOUSE, JOHANNESBURG.

Architects: Leck & Emley, Johannesburg.

Mines Hospitals.—Nearly all the gold-mining companies on the Rand have hospitals where cases occurring on their property are treated.

Queen Victoria Maternity Home and Hospital for Women.—The Queen Victoria Maternity Home was created by the Johannesburg branch of the Guild of Loyal Women, who, recognising the great need for such an institution, decided to raise the necessary funds and to equip the Home, as a permanent memorial to the late Queen Victoria. Funds were collected and suitable buildings found with wonderful energy and rapidity, and when the Home was completely equipped, through the exertions of the women of the Guild, it was handed over to the town as a working institution, a gift in memory of the beloved Queen after whom it was named. The Home is housed in temporary premises in Doornfontein, but a sum of money has been granted for building purposes, and it is hoped that in the near future it will be accommodated in its own premises. The Hospital is controlled by a committee of prominent residents of the town, from among whom an executive committee or board is appointed. There is a resident lady house-surgeon, who has had a most successful career in England and Scotland, with many years of practical experience in the work she has undertaken; a matron and staff of seven nurses and a consultant staff of six medical men. The Government has donated £10,000 towards a building fund, and has also sanctioned the gift of a site for the future hospital. This site is within the area granted to the town for public purposes, and known as the Milner Park. The Government donates £1,500 a year towards the working expenses of the hospital, and other sums are subscribed by the townspeople and the Municipality. The Lieutenant-Governor, Sir Arthur Lawley, and Lady Lawley, took a warm interest in the success and welfare of this institution, and gave much practical help and encouragement to the energetic founders. There are 24 beds in the hospital, and 221 patients were received during the 12 months ending July, 1905. The Home was opened in June, 1904, and at a later date it was decided that surgical cases should be received in addition to maternity cases. Free patients chiefly are admitted, but many pay full fees, and others whatever they are able to afford. The full fees are in proportion to those charged at the private nursing homes which aim at making a business profit. This institution has filled a great need, and although conducted at present rather on amateur principles, it bids fair to become a valued addition to the philanthropic establishments of Johannesburg.

Sanatorium.—The Nursing Sisters of the Order of the Holy Family support a large sanatorium situated in the vicinity of Johannesburg where both paying and free patients are received.

The Guild of Loyal Women.—The Guild of Loyal Women has branches in all parts of South Africa, and those in the Transvaal, fearing greatly to raise strife and racial questions by adherence to the principles laid down at the commencement, have devoted the greater part of their energy to purely benevolent work. The Johannesburg branch led the way, and in May, 1903, a Benevolent Committee was formed. Sub-Committees were appointed in Braamfontein, Fordsburg, Doornfontein, and Jeppestown, followed in 1904 by others in the central town, and in Vrededorp, Langlaagte, and such outlying places as Turffontein,

Henderson's Buildings, President-street and Von Brandis-street, Johannesburg.

Architects: Donaldson & Mann, Johannesburg.

Ophirton, and Rosettenville. Weekly meetings of the Benevolent Committee are held, in the house of one of the members, and these meetings are open to all members of the Guild. At first the services of a district nurse were engaged, but after the opening of the Queen Victoria Maternity Hospital this form of the work was discontinued. The Guild aims at assisting discreetly women and children of the respectable classes. Rescue work is not undertaken, such cases being handed over to the Salvation Army, or to the Sisters of Mercy who are engaged in that work alone. Cases of men in distress or destitution are referred to the Rand Aid Association. A Cottage or Home of Rest for women and children has come into being, and the work here is dealt with apart. The Benevolent Committee refers cases which are brought to their notice to the proper medium for obtaining the necessary relief or treatment. Some are sent to the Cottage, others to the General Hospital or to the other institutions referred to; and deserving cases are helped if possible in their own homes, by money grants if actually necessary, but more often by the issue of grocers' and chemists' tickets, and supplies of bread, meat, and clothes. Situations are found for women able and anxious to work, and children are placed, if needful, in the various orphanages in and around Johannesburg. The means to carry out this excellent work is provided by gift of necessaries, and by subscription, social entertainments, bazaars, and house-to-house collections. Old and destitute women are partially supported, and temporary food, shelter, or other assistance is granted to them and their families; tickets to the coast towns, to other parts of South Africa, or to England, where work or a home is guaranteed, are provided, and many distressing cases of illness and destitution are assisted and provided for in the Cottage. Much grateful help has been received from the tradesmen in the town and from the Central South African Railways and the Union-Castle Steamship Co. The Cottage is in no sense a Convalescent Home, but cases of bad health are not necessarily refused. Women are admitted before and after admittance to the General Hospital or to the Queen Victoria Maternity Hospital, and cases are received out of the General Hospital on the recommendation of the matron of that institution. The work of the Cottage is entirely done by the inmates, although none are obliged to work when unfit; and outside work, of the nature of cooking, sewing, preserving, &c., is carried on under the supervision of the matron, for a small profit, towards the expenses of the institution. The want of some such establishment as this had been long felt in Johannesburg, and the number of persons assisted in the Cottage, the gratitude subsequently testified by former inmates, and the very few cases, which have proved undeserving or intractable, clearly testify to the excellence of the work and the management. It is the only institution on the Rand affording shelter and a home for respectable women who are in temporary distress through no fault of their own. To the Guild of Loyal Women also belongs the credit of having equipped and inaugurated the Queen Victoria Maternity Hospital and the Convalescent Home at Orange Grove, both of which were presented as gifts to the town.

Nazareth House.—Nazareth House is the best-known and the most respected of the charitable institutions in Johannesburg, and is beyond question the most warmly supported. While not attempting to rival the Rand Aid Association in the scope of its work, it is difficult to express in words the place that it has filled during the growth and development of Johannesburg. This establishment was founded in 1894, and is an offshoot of the parent House in Broadway, Hammersmith (London), which extends its branches all over the world. The House is conducted by the Sisters of Nazareth, who themselves do all the work, often most onerous, entailed by their many responsibilities, and it is entirely supported by voluntary contributions, which include a grant of £300 per annum, from the Municipality of Johannesburg. The present building was erected in 1895, and was considerably enlarged in 1905. As it now stands it cost from £35,000 to £40,000. The area of the property attached is 30 stands, and this property was bought by the sisters on their arrival in Johannesburg. There are 14 sisters, which number is to be increased. The work consists of the care of aged and infirm people and orphaned and destitute children. At the time of writing there are some 270 children and 30 old people in the House, which is spacious and airy, well built, and beautifully clean. There are five large class-rooms (two for boys and three for girls), twelve spacious dormitories, and a large nursery, besides sitting-rooms for the old people, refectories, lavatories, bath-rooms, &c. The children are clean, neatly dressed, well fed, healthy, and exceedingly happy; they have a large playground, and many picnics and expeditions are organised to give them the necessary change and enjoyment so desirable for young children. The old people are equally well cared for. The institution is conducted on the soundest lines, and has well earned

Residence of Mr. G. W. Paddon, Parktown, Johannesburg.

Architects: Donaldson & Mann, Johannesburg.

the respect and affection with which it is regarded.

S. Margaret's Orphanage.—S. Margaret's Orphanage is a work founded and entirely conducted by the Anglican Church. It is the only charitable institution on the Rand for which the Church is responsible, all the other philanthropic work undertaken, parish work, rescue, the relief of distress, &c., being carried out in connection with the other existing benevolent institutions, such as the Guild of Loyal Women, the Rand Aid Association, and the House of Mercy conducted by the Sisters of Wantage in Pretoria. The Orphanage came into existence after the war, and was first located in S. Monica's Home, Doornfontein, where seven children were housed. Later on it was removed to Fordsburg, being accommodated in temporary premises at Turffontein. A site has been presented to the Orphanage, and it is hoped shortly to have it housed in permanent and suitable buildings. There are upwards of 30 children at present maintained and educated in this institution. Owing to lack of accommodation, many cases are constantly refused.

Rand Aid Association.—The Rand Aid Association is a secular and undenominational institution of the nature of the London Charity Organisation. It provides temporary relief of every description to persons or families in distress. Shelter, food, clothing, and medical assistance are given, the largest and most successful employment bureau on the Rand being administered by this excellent organisation. A special endeavour is made to obtain employment for soldiers and men of the irregular forces who fought during the late war. Households are helped with food and other temporary supplies to obviate the necessity of selling up the home; and inquiry in all cases by persons capable of discrimination ensures the public against imposture. These inquiries are kindly, if carefully, conducted; in fact it may be said that no charitable work in Johannesburg is so ably and unostentationsly carried out as that of the Rand Aid Association. The Association is the successor of the Present Help League and the Refugees' Aid Committee. The first-mentioned body was started in the early days of the Rand, which in some quarters are popularly supposed to have been free from poverty and the unemployed question. Some six acres of land in Fordsburg was placed in the hands of the trustees of the Present Help League, and upon this was erected a building used for a destitute boys' home. On the outbreak of war, the building was taken over by the British Relief workers, who were financed at first by the Temporary Relief Fund raised in South Africa, and subsequently by the Mansion House Relief Fund. The Fordsburg Home was used as a temporary shelter for destitute Englishmen. After the British occupation of the Transvaal the property lapsed to the Government, the trustees continuing to administer its affairs. The Refugees' Aid Department, formed to expedite the repatriation of destitute loyal and alien refugees, used the Home as a shelter for men; and when the unemployed trouble became acute, the trustees, some of the workers for the British Relief, and some members of the Refugees' Aid Department, joined in forming the Rand Aid Association. The Government assisted with a grant, and handed over the Fordsburg shelter to the Association, as also offices on Government property in Von Brandis Square, for an Employment Bureau. Substantial grants of money have been made by the Government in aid of the work, and the Town Council of Johannesburg gives £600 per annum out of the municipal funds. A complete register has been instituted by the Association of all persons receiving assistance from this and other sources on the Rand, to prevent overlapping. The Shelter in Fordsburg is admirably managed, clean, and comfortable. The grounds are cultivated to profit, mealies, potatoes, and all kinds of vegetables being grown for the use of the Home. The food supplied is plentiful and wholesome, and the Superintendent is never afraid to invite a chance visitor to take pot-luck at the common table. Tobacco, of the kind grown in the country, is provided for the inmates. The work of the Shelter is done by the inmates, the cook and gardener only receiving salaries. Bad characters, and persons disobeying the rules or creating a disturbance, are not re-admitted. Poultry is kept, and a good trade is done with eggs, which realise large prices on the Rand. Vines, trained pergola-fashion, produce an abundance of grapes, which are sent to the Undenominational Children's Home. Peaches are also grown in the grounds with great success, and are consumed in the establishment. The number of men assisted in the Shelter is very large, and has shown a steady increase ever since the conclusion of peace. Very many men, besides temporary assistance, have been provided with permanent situations through the agency of the Rand Aid Association.

BRIDGE OVER THE RAILWAY, TWIST-STREET, JOHANNESBURG.

Other charitable institutions of Johannesburg that deserve mention include the Alexandra Convalescent Home, which, like the Queen Victoria Maternity Hospital, was launched and presented to the town by the Guild of Loyal Women. At the time of writing it is the only convalescent home in Johannesburg—the King Edward VII. Convalescent Home (which was opened by Lord Milner in 1902) having died of inanition. The French Société de Bienfaisance, established in 1897, for the relief and assistance of necessitous French subjects, built a shelter known as the "Asile de Nuit," where many homeless and destitute persons of all nationalities were given temporary aid. This establishment was the most completely equipped of its kind on the Rand. During the war it was placed at the disposal of the Boer authorities, and subsequently of the British military authorities, for the shelter of the aged and infirm. Later on it was placed at the disposal of the Refugees' Aid Department, for the housing of destitute refugees whose homes had been broken up. During the continuance of hostilities the organisation of the Société de Bienfaisance rendered great assistance in the equipment of an ambulance hospital in premises lent by the Marist Brothers. This ambulance was further assisted by the Association des Dames Françaises, which sent to the Transvaal a field hospital and huge supplies of hospital requisites and comforts. These were lavishly dealt out, and the institution was a very popular one with the British forces. Later on, through lack of funds, the Asile de Nuit was disposed of to the Government. The Société de Bienfaisanee now gives temporary assistanee to Freneh subjects by providing them with food and lodging in respectable quarters, and by sending them back to France should such a step be desirable.

THE DOORNFONTEIN SYNAGOGUE.

Architect: M. J. Harris, M.S.A., Johannesburg.

The Undenominational Children's Home carries out a good work in caring for orphaned children, or those whose parents are unable through stress of circumstanees to provide them with a home. This institution removed its headquarters to Natal during the war. Its work has been mueh restricted owing to its accommodation being of a temporary nature, but in the new and permanent premises ereeted in 1906 in the suburb of Observatory it may be expected that its scope will be greatly expanded. The Home is supported by voluntary eontributions, and is controlled by a eommittee of ladies.

The Jewish Helping Hand and Burial Society does a vast amount of work among the needy members of the Jewish community, who are very numerous in Johannesburg. This society has been in existence since 1887, and expends an average of £4,000 per annum on its work of eharity. It is ably and wisely eonducted. The Jewish eommunity also supports an orphanage for Jewish children, which was started subsequent to the war, and supplied a felt want.

The Scandinavian eommunity have a Sick and Burial Soeiety for work among their own people.

The Sisters of the Order of the Good Shepherd conduct a Rescue Home, established after the British occupation. This is situated at Orange Grove. It is admirably supported by the Roman Catholics, who are fairly wealthy in Johannesburg. Sewing and laundry work are taken in at the Home.

JOHANNESBURG PUBLIC LIBRARY.

The Publie Library of Johannesburg dates its establishment from 1889, and owes its existence to the efforts of some of the pioneers of the Rand to secure intellectual as well as more material improvement for the young community. At a meeting presided over by Sir Thomas Scanlen in the year mentioned it was decided to found such an insti-

tution, and funds to the amount of £700 were immediately subscribed. The Library started with a collection of 1,000 volumes, in rooms in the building devoted to the Young Men's Christian Association. So successful did the institution become that in 1898 new and larger accommodation became necessary. £7,000 was subscribed towards a building fund, and the premises in Kerk-street (occupied up to the date of writing), off Von Brandis Square, and close to the offices of the High Commissioner's staff, were erected. In 1898 the library contained 9,000 volumes; it had 750 subscribers, and an annual income of £1,814. At the close of 1905 the number of volumes had increased to 17,410, there were 1,741 subscribers, and the income had reached £7,072. Of the receipts, £650 is an annual grant from Government, and £650 an annual contribution from the Municipality (which, it may be mentioned, is represented on the committee of the Library by three of the Town Councillors of Johannesburg). The additions to the collection of books since the war have been upwards of 3,000 volumes a year, and a satisfactory reference library has been established, although this section, through lack of funds, may not be described as having yet been brought completely up to date. There is a subscriber's reading-room in connection with the reference branch, and during the year 1905 the attendance in this section numbered 144,000. The attendance numbers for the free reading-room (a great boon to the populace) during the same period was 264,000, and the total number of visits to the Library recorded was 468,879. The total issue of volumes was 60,879. The daily average issue of works was 202. Of the 60,879 volumes taken out, 43,871 were works of fiction, or 72·06 of the total. Classifications other than fiction include history, biography, travel, science, sociology, philosophy, philology, religion, ancient classics, belle-lettres, useful and fine arts, poetry and drama, and works on general subjects. The general annual expenditure for 1905 for the Public Library was £7,076 18s. 3d., of which £1,000 was devoted to expenses of the free reading-room. This room was declared open by Lord Milner in December, 1904, as one of the results of an increase in the Government and municipal grants. No public institution in Johannesburg, it is safe to say, has been more gladly welcomed and appreciated. A special feature of the Library since 1905 has been the addition to its resources of the Seymour Memorial Library in the shape of a collection of scientific works by best modern authorities, for which a sum exceeding £11,000 was subscribed recently. The subject of this memorial was the late Mr. Louis Seymour, an American gentleman who was consulting engineer on the Rand to the firm of Eckstein's, and whose popularity and ability were great and unquestioned. To his efforts was due the raising of the Rand Pioneer Regiment during the war, composed of men who had worked on the mines or as artisans on the Rand, officered by skilled engineers also from the Rand mines, or selected from the Royal Engineers. To this corps was entrusted the re-building of bridges and culverts from Norval's Pont, Cape Colony, to Johannesburg. At Sand River, in the then Orange Free State, Mr. Seymour, who held a Major's commission, fell fatally wounded while leading his men in a gallant charge to defend a half-finished bridge. The idea of giving his name to a scientific section at the Public Library was a happy one, and met with universal approval. There is hardly any public institution in Johannesburg so harmoniously controlled and so fortunate in its committee and officials, and in its relations with the public, as the Library. The charge for subscribers is £1 1s. per annum.

INTERIOR OF THE DOORNFONTEIN SYNAGOGUE.

Architect: M. J. Harris, M.S.A., Johannesburg.

Financial Relations Commission.

The relative responsibility incurred by the Government and the local governing authorities in respect of permanent endowments, hospitals and infirmaries, paupers and unemployed, the upkeep of main roads outside municipal areas, with other questions of an equally debateable nature, was the subject of an exhaustive inquiry by a Commission which was appointed by

Lord Milner in June, 1904, and known as the Financial Relations Commission. Evidence was taken by this Commission in many different centres of the Transvaal. The report, a very lengthy document, embodying many suggestions of a highly contentious nature, was placed before the public early in 1906, and a Provisional Committee, with representatives from all the Transvaal municipal bodies, was appointed to consider suggestions contained therein. The result of the deliberations of this body, which must necessarily be protracted, were expected during 1906. The retention in Government revenues of the native pass fees, which formerly were devoted to hospital maintenance, and for which a Government grant has been substituted; the site for the erection of a hospital for coloured persons in the Witwatersrand; the best positions for supplementary hospitals or infirmaries along the reef, and the advisability of establishing a poor rate under municipal control, are among the points recommended by the Committee for consideration.

JOHANNESBURG CHAMBER OF COMMERCE.

To write anything like a history of the Johannesburg Chamber of Commerce would be tantamount to writing a review of the commercial enterprise of the Rand. It is true that it was not for some years after the discovery of the gold fields that the Chamber sprang into existence; but when the permanent character of the deposits on the Rand become assured, and it was realised that an enormous new trading centre had been established, the mercantile community at once took steps to band themselves together in an association for the mutual safeguard of interests. In this they were only following the lead of the mining houses, which, early in the history of Witwatersrand fields, had started the Chamber of Mines. Towards the end of 1889 the movement was inaugurated for founding the Chamber of Commerce, but some months elapsed before the proposal took definite shape; and it was not until March, 1890, that at a meeting at which all the principal firms were represented the Chamber was actually started. At its inauguration 48 firms put down their names for membership, and at the present time the membership roll is no less than 160. The first President was Mr. J. R. Morisse, and the first Vice-President was Mr. Francis J. Dormer, then editor of the *Star*, Johannesburg, and managing director of the Argus Company. The Committee elected at the start consisted of Messrs. W. A. Martin, O. Lenz, D. Holt, W. Boustred, W. Scotterly, J. A. Taylor, and D. Fenton. Owing to a variety of causes several changes were made, during its first year, in the officers of the Chamber. Mr. J. R. Morisse and Mr. Dormer both resigned their positions as President and Vice-President, and Mr. J. Direks (of Messrs. Malcomess & Co.) and Mr. W. A. Martin (of Messrs. Parker, Wood & Co.) were elected to the respective vacancies, while Mr. Morisse assumed Mr. Martin's position on the Committee. Mr. F. G. Samson was appointed the first secretary.

MEMBERS OF THE JOHANNESBURG CHAMBER OF COMMERCE, 1905.

From the day of its inception the Chamber leaped at a bound right into the forefront of the commercial institutions of South Africa. Trade with the Transvaal was progressing at a rate beyond the anticipation of even the most optimistic; and the Chamber was called upon to advise the Government, which was quite unprepared for such a sudden burst of prosperity, upon highly important and at the same time very intricate problems connected with trade. Realising the fact that a general interchange of views could only be for the advantage of the commercial interests generally, the Chamber very soon after it was inaugurated consulted all the other Chambers in the country with a view to forming an Association of Chambers of Commerce. This movement originated towards the end of 1890, and was warmly supported, though it was not until a couple of years later that it culminated in the formation of the present Association of Chambers of Commerce of South Africa. The first Congress was held in Johannesburg in December, 1892, and was attended by delegates from all the important commercial centres of South Africa. Just about the time that the Chamber of Commerce came into existence, one of the chief questions agitating the whole town, and not alone the commercial community, was that of Arab trading. The Chamber adopted a very determined attitude against the free and unfettered trading by Arab merchants; and, although by no means getting from the Government all that they asked for, a good many concessions were made, and at any rate the evil was stopped. The Chamber was mainly instrumental in the formation of the Commercial Brokers' Association, which was practically an offshoot of the Chamber of Commerce, and was formed for the purpose of settling differences between the merchants and brokers. Each succeeding year witnessed a very numerous accession to the ranks of the members; in fact, the Chamber grew in importance and influence to such an extent that on a good many matters—particularly in connection with railways and customs—it practically held the position of a consultative body in relation to the Transvaal Government. Mr. F. G. Samson, who had been the first appointed secretary, resigned in 1891, and was succeeded by Mr. E. L. Baker, and just about this time Mr. H. F. E. Pistorius accepted office as President, a position he ably filled for four years running; and it may not be uninteresting to recall the fact that for a period of something like ten years Mr. Pistorius and Mr. W. Hosken between them held the office of President. How much the efforts of these two gentlemen have assisted in the remarkable success of the Chamber it is impossible to say. Both gentlemen are experts in commerce, using the term in its broadest sense, while it is generally admitted that Mr. Hosken is one of the greatest commercial authorities in South Africa. *En passant* it may be mentioned that the year 1892 saw the opening of the railway into Johannesburg linking with the coast, and the Chamber took its part in the celebrations that followed. The annual reports of the Chamber, as now published, are models of conciseness and variety of information, and a perusal of them, at what now seems a very far-off period, gives some indication of the troubles that beset the trading community, which really seems to have been hampered all round. The Government through its customs tariff, and the Netherlands Railway Company by means of the railway rates, milked the trader in every possible way, though of course in the long run it all came out of the pockets of the public. Mr. E. C. Lowe was appointed secretary in 1894, a position which he occupied until two or three years ago, when he resigned to accept the secretaryship of the Chamber of Trade, which was formed by a number of the wholesale houses and some of the retail firms which had seceded from the Chamber of Commerce on a question of policy. In 1894 and 1895, the years of the great boom, the advance in trade was somewhat phenomenal. Every firm of note in South Africa that had not already done so opened branches in Johannesburg, and the representatives of these houses naturally joined the Chamber, which at this juncture had a membership of something like 200. It exerted a tremendous influence, not alone in the Transvaal but all over South Africa, and even in England too, and in 1896 it was accepted as an affiliated member by the Congress of Chambers of Commerce in London. To show what an influential body the Chamber had then become, it may be of interest to place on record the office-bearers during 1895–6:—Mr. H. F. E. Pistorius, president; Mr. W. Hosken, vice-president. Committee: Mr. J. A. Rogers (of Parker, Wood & Co.), Mr. W. Hutchison (of Reid Bros.), Mr. C. A. Garland (of Garland Bros.), Mr. S. L. Heyman (of Lewis & Marks, and the Hatherly Distillery). Mr. J. C. Lucas (of J. Lawrence & Co.), Mr. T. W. Dukes (of P. J. Petersen & Co.), Mr. W. Cooke (of T. W. Beckett & Co., Ltd.), Mr. C. Chudleigh (of Chudleigh Bros.)—names which stand for all that is best among the trading community and public generally. In that year, too, it may be recorded that no fewer than 32 firms joined, and the delegates to the Associated Chambers of Commerce were Messrs. Pistorius, Hosken, and W. F. Lance, while Mr. S. L. Heyman represented the Chamber at the Congress in London. Mainly through the efforts of the Chamber the penny postage was adopted in the Transvaal that year, and a little later this was followed by the universal penny postage throughout South Africa with the exception of Rhodesia. Some of the facts that may be gleaned from the reports of the Chamber during the years 1894–5–6 give one an idea at a glance of how the town prospered and went ahead. For instance, during 1895 no fewer than 2,538 new buildings were put up in Johannesburg. In 1894 the value of the merchandise imported into the Transvaal amounted to £6,440,215, and in 1895 the value had risen to £9,816,304, while in 1896 it was no less an amount than £14,088,130. This period, too, saw further links wrought in the great chain of railways. In October, 1895, the Natal line was joined up at Heidelberg, while a few months later the Klerksdorp railway was opened. In all these improvements, reforms, and fresh undertakings which the Government instituted, the Chamber took a very leading part. There ensued such an era of prosperity that the Government seemed inclined to let well alone, and they had practically to be goaded into providing the most urgent public needs. In conjunction with the Chamber of Mines, barely a month passed without a deputation going to Pretoria on one or other public question; in fact, it may be said without the least exaggeration that commercial questions did not comprise more than a half of the business undertaken by the Chamber. A number of the small traders in the latter nineties, feeling that too much time was devoted to matters altogether outside the ordinary scope of the Chamber, formed themselves into another body called the Mercantile Association, of which Mr. L. Eisenberg was secretary, but this did not survive the war. After the war there was a great increase in the number of members of the Chamber, which considerably exceeded 200. As to the unfortunate split which resulted in the secession of certain members, and the formation of the Chamber of Trade, reference is made to this in the article appearing elsewhere under the heading "Chamber of Trade." Mr. E. C. Lowe, as stated above, resigned the secretaryship to take up a similar

position in the new Chamber, and Mr. W. Smale Adams, F.C.I.S., was appointed secretary, a post which he still holds. The Chamber has recently moved into very handsome offices in Provident Buildings, Fox-street, Johannesburg, where all books of reference likely to be useful to commercial men are available for members. The President of the Chamber in 1905 was Mr. H. F. E. Pistorius (of Messrs. E. W. Tarry & Co., Ltd.), being the seventh time he had filled the chair; the vice-presidents were Mr. A. A. Noble and Mr. J. W. Quinn. The Committee consisted of Messrs. J. Brown (Brown Bros.), J. Forrest (J. Forrest & Co.), J. Holdcroft (Garlick & Holdcroft), A. Keeling (Abinger Keeling & Co.), J. C. Lucas (J. Lawrence & Co.), W. A. Martin (Parker Wood & Co., Ltd.), G. Mitchell (Gordon Mitchell & Co.), A. Y. Niven (Niven & Mitchell), J. A. Noble (Philip Bros.), A. Rogaly (E. and A. Rogaly), W. Scatterly (Paddon & Brock, Ltd.), and J. N. Sellar. A glance at the excellently-compiled report for the year ended February 28th, 1905, gave some idea of the large amount of work the Chamber got through in twelve months. Including meetings of sub-committees and trade sections no fewer than 135 meetings were held. The report dealt exhaustively with almost every topic of importance to the commercial community, and was in itself a very valuable book of reference. Its compilation reflects the greatest credit upon the courteous secretary, Mr. Smale Adams.

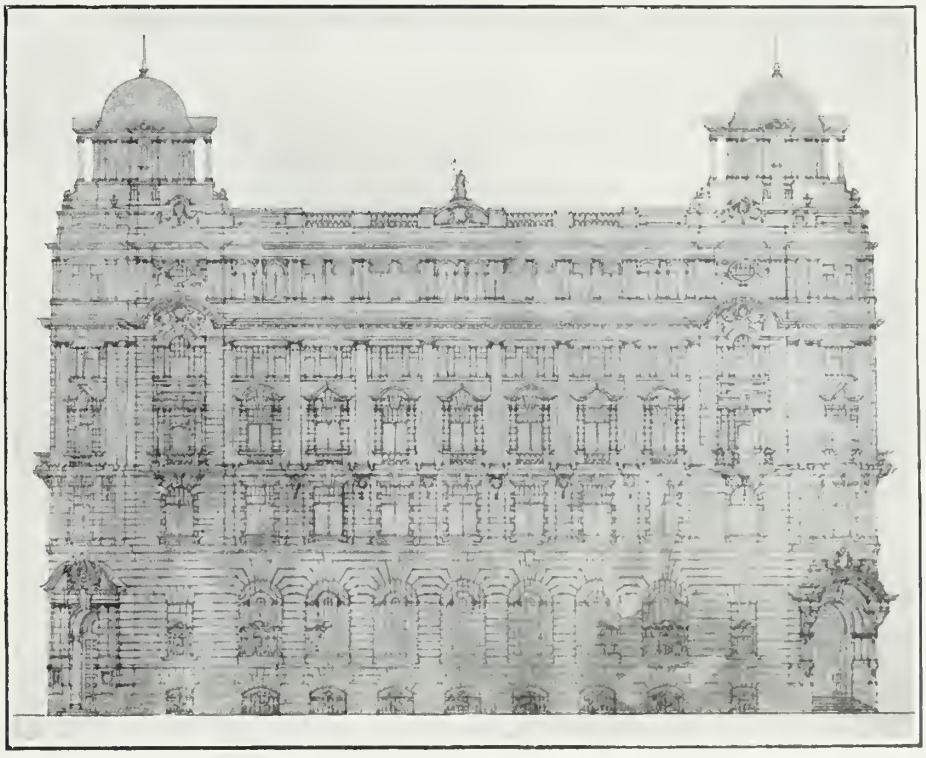
CUTHBERT'S BUILDINGS, PRITCHARD-STREET, JOHANNESBURG.

Architects: Stucke & Bannister, Johannesburg. *Photo.: Duffus Bros., Johannesburg.*

THE CHAMBER OF TRADE, JOHANNESBURG.

The Johannesburg Chamber of Trade as constituted to-day forms one of the most powerful, if it is not the most powerful, trade association in South Africa. Although only some four years old, practically all the firms who are members have been connected with Johannesburg since the earliest days, and prior to the war were members of the sister body, the Chamber of Commerce. Shortly after the re-opening of trade in Johannesburg, following the cessation of hostilities, a considerable divergence of opinion in regard to mercantile interests made itself manifest, and, without entering into a large amount of detail, it may be stated that the mercantile community found itself divided into two camps; although still owing allegiance to the Chamber of Commerce, there was what was known as Section "A" and Section "B," the former embracing nearly all the wholesale houses, and many of the large retail dealers. It became more and more a necessity in the minds of the larger merchants that either the constitution of the Chamber of Commerce must be altered, or that a new commercial chamber must be created. Finally, the Chamber of Trade was inaugurated during the month of May, 1901. In the following month, however, an attempt was made by the Chamber of Commerce to unite the forces of the mercantile community again, and on the 13th June, 1901, a letter was addressed to the newly-formed body asking for a meeting to be arranged to prevent, if possible, the division of the representation of commercial interests, and to see whether a *modus vivendi* could not be arrived at. While those who had so far decided to found a new institution were by no means confident that a workable agreement could be come to, they felt that it was their duty to meet the advances of the Chamber of Commerce if that were possible, and accordingly a joint committee was arranged for. After protracted negotiations a new constitution was drawn up, and submitted to a general meeting of the Chamber of Commerce on September 12th, 1901, as a basis of amalgamation. One of the main points stipulated for by the members of the Chamber of Trade was that the old rule of the Chamber of Commerce, under which the firms paying a higher subscription were entitled to two votes on all questions, as against only one for those paying a smaller

subscription, which latter class formed the majority of the Chamber, should be altered. The proposition was that while on general questions of commerce every member should have one vote only, the members paying the larger subscription should retain the second vote for the annual election of President only. The amalgamation was carried by a narrow majority on November 7th, 1901, and the rules under which the amalgamation was effected worked quite smoothly, but it was evident from the first that there was an organised desire to defeat its objects. This culminated in a notice of a special general meeting to be held on February 20th, 1902, to revert to the original rules prior to the amalgamation. Owing to the dual vote being voluntarily relinquished, the retrocession was carried by a large majority. It once more became apparent that the original idea to form a separate Chamber of Trade was the only course open. Accordingly the Chamber of Trade was once more brought into existence, its re-creation dating from April 28th, 1902. All the principal wholesale houses, and many of the large wholesale and retail firms, became members, and really the line of demarcation between the two Chambers—that is the Chamber of Trade and the Chamber of Commerce—may be taken as representing the differences between the wholesale and retail interests. Mr. E. C. Lowe, who had been the secretary of the Chamber of Commerce from 1894, became the new secretary of the Chamber of Trade; and it may be interesting to state that the first officials and committee were:—President, Mr. W. Leslie Daniels; vice-president, Mr. W. J. Green (of H. Mosenthal & Co.); Executive Committee, Mr. Otto Lenz (of Messrs. Reunert & Lenz), Mr. A. H. Nicolson (of Messrs. Hunt, Leuchars & Hepburn); Mr. C. A. Garland (of Garland Bros.); Mr. W. E. Park (of Messrs. Fraser & Chalmers, Ltd.); and Mr. H. D. Solomon (of the British Engineers' Alliance). Subsequently, as the Chamber gained a larger membership, additions were made to the number of officials, and at a special meeting on November 21st, 1902, Mr. A. F. Robinson (of Messrs. Arthur Koppel & Co., Ltd.) was elected a second vice-president, while the following were added to the Executive Committee:—Mr. R. Hamilton (of Messrs. Hamilton & Co., Ltd.); Mr. W. Cooke (of Messrs. T. W. Beckett & Co., Ltd.); Mr. J. Ellis (of Stewart & Lloyds, South Africa, Ltd.); and Mr. H. A. Barsdorf (of Messrs. Barsdorf & Co.). On the last-named resigning, Mr. L. Spitzer, representing the same firm, was elected on February 26th, 1903. On the 25th November, 1902, the Chamber of Trade was elected as affiliated members of the Association of Chambers of Commerce of South Africa, and Messrs. O. Lenz, W. E. Park, and S. Sykes were elected delegates to the Conference to be held in November, 1902, at Kimberley. However, prior to that date—to be exact, October 28th—the Chamber of Commerce handed in a letter of protest against the affiliation of the Chamber of Trade, mainly on the ground that it was never contemplated that any town should be given double representation, and also that no weight would be given by the different Governments to the towns which were divided and sometimes antagonistic in their opinions. The Chamber of Trade sent in a spirited rejoinder to this protest, and, after the matter had been referred back for re-consideration by the General Executive Committee, the affiliation of the Chamber of Trade with the associated body was allowed to stand. On the 15th September, 1903, the Chamber received official recognition by the Transvaal Government, and on that date received its incorporation under the provisions of Ordinance No. 56 of 1903. The second President of the Chamber was Mr. H. D. Solomon, who was elected to a similar office in 1904-5, while for the year 1905-6 Mr. A. F. Robinson (of Messrs. Arthur Koppel, Ltd.) was elected to this important position. During the year ended in 1905 an attempt had been made to amalgamate the two bodies so as to present a united front whenever commercial interests on the Rand were affected. An informal meeting of members of the Executives of the Chambers of Trade and Commerce was convened, and as a result on September 16th, 1905, a resolution was adopted favouring amalgamation under certain conditions; but although lengthy negotiations took place, it was found impossible to arrive at a satisfactory basis of amalgamation, and consequently negotiations were broken off. It does not now seem likely that the two bodies will ever become united again. A perusal of the annual reports issued by the Chamber give a sufficient indication of the amount and variety of the work that is accomplished by the Chamber in the course of a year. Although virtually an offshoot of the Chamber of Commerce, and although the two have at times shown a considerable amount of antagonism, still the Chamber of Trade has always been willing to combine with the parent Chamber when any good was to be accomplished for the com-



THE STANDARD BANK OF SOUTH AFRICA, LTD.

Handsome new block in course of erection at the corner of Harrison and Commissioner-streets.

Architects: Stucke & Bannister, Johannesburg.

mercial community, and there is little doubt but that the opinions of the two bodies either individually or when combined have had a good deal of weight with the authorities. For instance, on the important question of shipping freights the opinion of the Chamber was sought, and at the request of the Chairman of the Shipping Freights Conference a representative of the Chamber was commissioned to give evidence. The Chamber also participated in the mercantile conferences with the Railway administration held at Bloemfontein and Johannesburg in August, 1904, and January, 1905. A very important subsidiary of the Chamber is the establishment at the offices of the Chamber in London House, Loveday-street, of a thoroughly up-to-date commercial library, containing all the most useful books of reference and copies of all the standard codes. The Chamber through its officials, and particularly through its energetic secretary, Mr. E. C. Lowe, watches very carefully the trend of public events, and the frequent communications to the public press, on all matters of general interest coming within their scope, indicate that it is no dog-in-the-manger policy that is observed, and that, apart from the members, the public generally receive the consideration of the Chamber. The total membership in September, 1905, was 72, and during the year ended May, 1905, no fewer than 65 meetings of one form or another were held. This alone gives some slight idea of the amount of work that has to be done. The new President is, as previously stated, Mr. A. F. Robinson, who was re-elected, and the vice-presidents are Messrs. O. Lenz and W. E. Park. The Executive Committee in 1905 was composed of Messrs. R. Niven, A. H. Nicolson, J. D. Ellis, R. B. Barsdorf, E. W. Collins, J. W. Kirkwood, R. Hamilton, H. W. Soutter, and R. B. Rintoul.

EDGAR ALLEN AND CO., LIMITED.

The firm of Edgar Allen and Co., Ltd., of the Imperial Steel Works, Sheffield, is a concern of no mushroom growth, having been originally founded by Mr. William Edgar Allen nearly forty years ago. In the year 1890 it was converted into a private Limited Liability Company, the directors being Messrs. William Edgar Allen, Robert Woodward, Alfred E. Wells, Frederick A. Warlow, and William Crosby. The Company was formed to take over and extend the business of steel, file, and saw manufacturers and general merchants, commenced by Mr. William Allen Edgar in 1868. The new firm took up the manufacture of steel castings on a large scale for railway, mining, electrical, and general engineering work. The British patent rights of the process employed by them for making steel into castings was acquired by the Company from Monsieur Alexandre Tropenas, of Paris, this process being subsequently adopted at the Woolwich Arsenal under licence from Edgar Allen and Co.

So far as South Africa is concerned, the firm commenced business at Johannesburg in the year 1894, and has since done a very successful trade with the mines of the Rand in mining-drill steel, tool steel, steel castings, files, &c. The firm is ably represented in the Transvaal by Mr. G. F. Wills, who succeeded Mr. Crosby in 1902, when

EDGAR ALLEN & CO., LIMITED, Imperial Steel Works, SHEFFIELD.
Intricate Tramway Crossings, Nottingham. Machine-moulded Steel Gearing.

the latter returned to England to take up a position at the works.

In 1903 the firm bought the business of Askhan Brothers and Wilson, Limited, of Sheffield, thus materially extending the scope of their operations. In tramway work the latter firm had been engaged for about a quarter of a century, making a speciality of tramway points and crossings, in the manufacture of which Allen's Imperial manganese steel is now largely used. A few years ago the firm introduced into the market the Edgar Allen Air-hardening High-Speed Steel. This brand of steel is now very extensively used by railways and engineering firms in Africa, as well as in Great Britain, the United States, and other parts of the world. The firm are also sole makers of Johnston's patent central automatic radial coupling buffer, which has been in use by the Natal Government Railways for many years, and are also manufacturers of elevators, conveyors, and crushers.

Recognising the necessity—in these days of commercial and industrial competition—of keeping in close personal touch with their customers in the foreign and colonial markets, Messrs. Allen and Co. have branches in New York, Chicago, and Japan, and resident representatives and agents throughout the United States, Canada, India, and Australasia, whilst in Africa, besides the important branch in Johannesburg, there is an agency at far-off Bulawayo.

YARD OF THE ANGLO-AFRICAN TRADING COMPANY.

THE ANGLO-AFRICAN TRADING COMPANY, LIMITED.

This firm, which holds a leading position among the commercial houses of Johannesburg, was established in London in 1896. Simultaneously the Company started operations in Bulawayo, Rhodesia, where spacious premises were erected and equipped for the transaction of the business of wholesale importers and dealers in mining material. Subsequently, branches were opened in Gwelo and Salisbury, at both of which places handsome structures, heavily stocked, have been built. To facilitate its timber business the Anglo-African Trading Co., Ltd., established sidings and bondage stores at Port Elizabeth and Beira early in 1905, and this venture has proved of great convenience. The firm has also acquired the old-established business of Messrs. W. P. Brown, Ltd., in Loveday-street, Johannesburg, where extensive stocks are on hand. A large wholesale trade is carried on in mining requisites. The head offices of the Company are at 9, Billiter Square, London, E.C. The managing director is Mr. F. Corfield Smith.

THE BRITISH SOUTH AFRICAN EXPLOSIVES COMPANY, LTD.

About 13 miles from Johannesburg in a northerly direction are situated the working and residential premises of the Modderfontein Dynamite Factory, the property of the above Company. Dynamite is a necessity to the mining industry, and many financial intrigues, in days gone past, were woven around the supply of this dangerous but very useful material. The manufacture of dynamite was for financial considerations declared a State monopoly by the Government of the South African Republic, and a concession was granted to a Company which had its headquarters in Hamburg, Germany. Subsequent to the war, a Commission, presided over by Mr. Lyttleton, was appointed to inquire into the concession and its economic effects upon the mining

industry. As a result it was decreed that the monopoly should be abolished. On the re-construction of the Company, under the title of the British South African Explosives Co., Ltd., of which Lord Ribblesdale was the first chairman, the headquarters were removed to London. Prior to the granting of the monopoly, and the construction of the premises at Modderfontein, the works were at Leeuwfontein, near Pretoria. Operations commenced at Modderfontein in 1896. In the early days, wagon transport greatly increased the difficulties and the expense of production, and the advent of railways heralded a great expansion of the Company's business. With the enormous development of the mining industry of the Transvaal just before the war, the Dynamite Factory's output leapt in little more than three years from 80,000 cases (the output for which the factory was originally designed) to 400,000 cases annually. This latter amount is equal to 10,000 tons, which was the quantity produced in 1899, the year in which the war commenced. At the present time the Factory is capable of turning out about 500,000 cases, each containing 50 lbs. of explosives, per annum. The Company produces explosives on a larger scale than at any other manufactory of the kind in the world. During the early period of the war the Factory was commandeered by the Boer authorities and used as an arsenal. After the occupation of the Witwatersrand and Pretoria districts by the British troops the premises passed under military control, and for about a year they served as the headquarters establishment of the South African Constabulary, the factory hospital being used as a central hospital for the force. The situation of the Modderfontein Factory is extremely picturesque, sheltered by a high ridge, well wooded and watered, and safely removed from the proximity of towns and villages. Three large dams have been constructed to conserve the water supply, this being an essential item in the process of dynamite manufacture. The water supply of the neighbourhood is abundant, and adds greatly to the beauty of the surrounding scenery. There are five separate factories, each a complete unit under the control of a superintendent. There are also extensive acid works, at which nitric acid and sulphuric acid are made, and thence conveyed by means of pipes to the nitro-glycerine works. Subsidiary departments for the making of ammunition boxes, cartridge wrappers, pipes, &c., as well as other necessaries, are contained on the property. Few of the raw materials used in the manufacture of the explosive are procurable in quantity in the Transvaal. Nitrate of soda is imported from Chili; sulphur, from Sicily; and glycerine, from various parts of Europe. Upwards of 350 European employés reside at the Dynamite Factory in the employ of the Company, in addition to 1,000 natives. There is good housing for the administrative staff and the working hands, and a school attended by upwards of 100 children. Both officials and workmen have their club, and there is a library provided by the Company for the use of its employés. The explosives manufactured at these works take the highest place for effectiveness and suitability to local requirements, and on their merits command a large proportion of the immense business in explosives done in the Transvaal. The business of the Company is conducted from their

THE BRITISH SOUTH AFRICAN EXPLOSIVES COMPANY, LTD.
View of portion of Works.

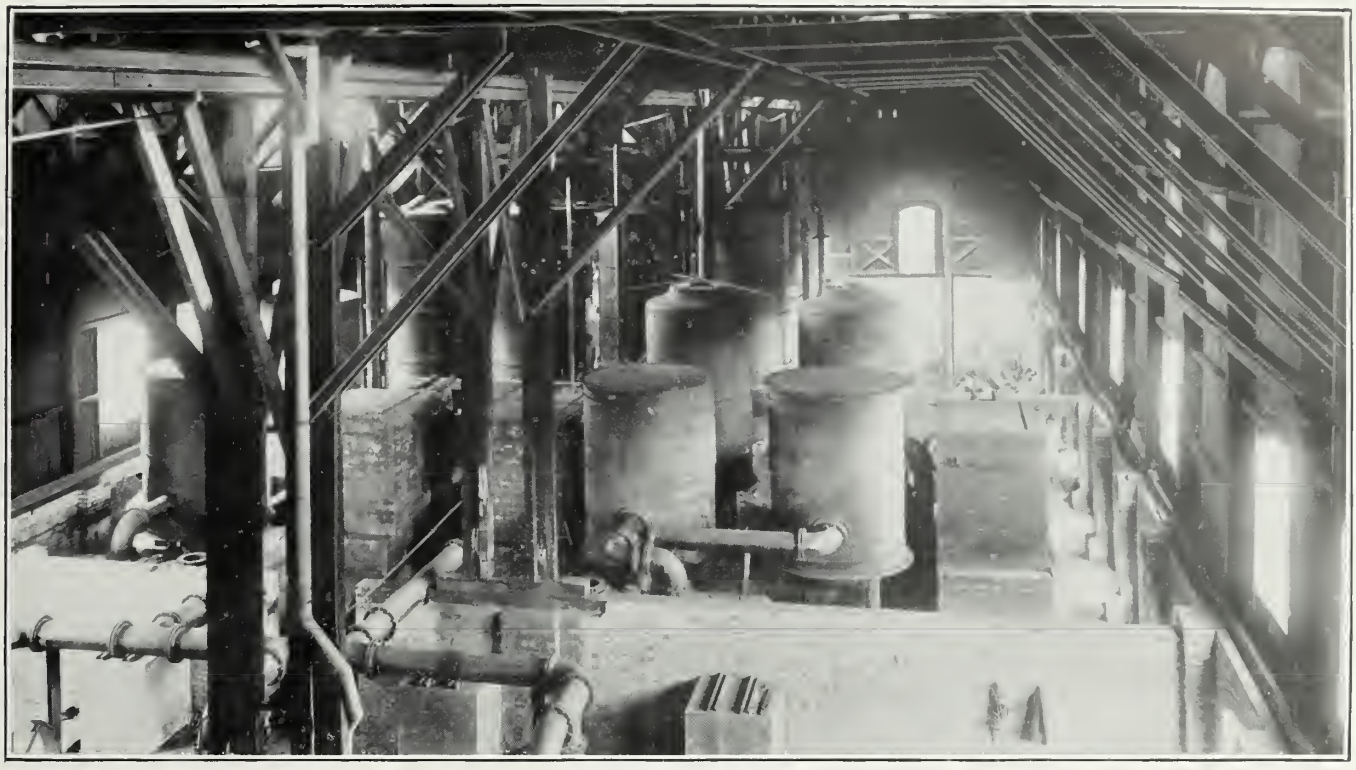
THE BRITISH SOUTH AFRICAN EXPLOSIVES COMPANY, LTD.

View of portion of Works.

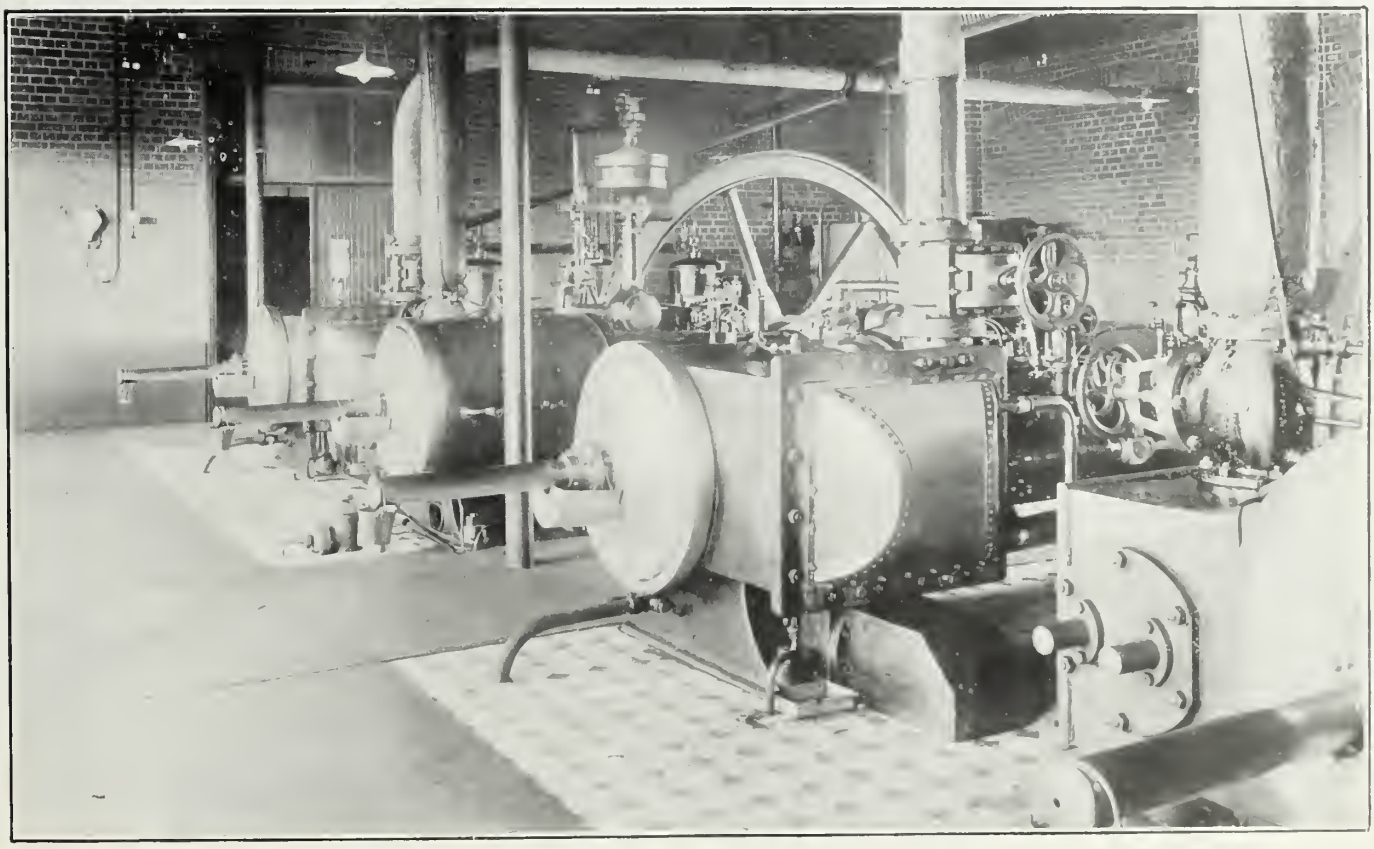
Officials' Club House.

A Room in the Central Laboratory.

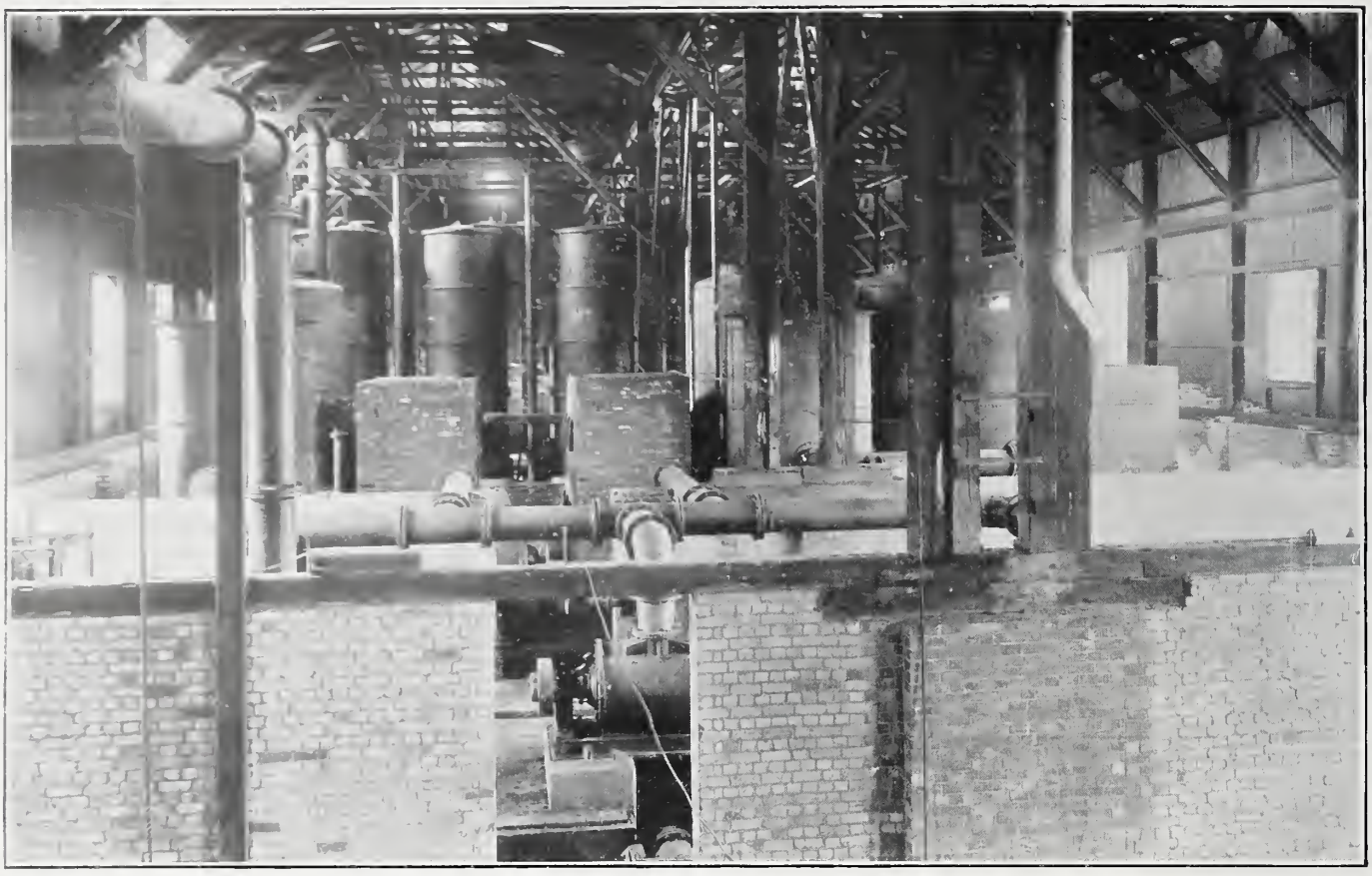
A Room in the Central Laboratory.



Sulphuric Acid Anhydride Plant.



Compressors.



Sulphuric Acid Anhydride Plant.

Concentration of recovered Sulphuric Acid.

offices in Johannesburg. The local director in charge of the Company's affairs is Mr. Wm. Hosken, who is a member of the Transvaal Legislative Council, and President of the Associated Chambers of Commerce of South Africa. Our illustrations give interesting views of the property and works.

THE BRITISH SOUTH AFRICAN EXPLOSIVES COMPANY, LTD.
One of the Packing Houses.

Messrs. BURROUGHES & WATTS (S.A.), LTD.

The firm of Messrs. Burroughes & Watts is well known not only in South Africa, but wherever the Briton has set his foot, in all parts of the world. Nevertheless, it is not only as that of successful billiard-table manufacturers that the name will be remembered in the Transvaal, but as one among the benefactors of the country. The head and chief partner of this house led the way and set an example, on his second visit to the Transvaal, in a matter that has been strangely overlooked by many whose homes and closest interests are wrapped up in the progress and development of industry and education in the new Colonies. When the question of education first fixed the attention of the administrative rulers of the Transvaal, and members of the public were called into their counsels, one of the main points decided upon was the necessity for large facilities for technical education; and the Transvaal Technical Institute, which was incorporated with the Kimberley School of Mines, was formed in Johannesburg. Mr. James S. Burroughes, F.R.G.S., F.Z.S., who visited the Transvaal with the members of the British Association in 1905, was impressed with the great value and the scope of this institution, and presented it with the first scholarships to be retained in its gift—namely, one for mineralogy, one for agriculture and forestry, one for engineering, and one for chemistry. These, to be known as the James Burroughes Scholarships, are tenable for a term of four years. Thus Mr. Burroughes has established a claim to the gratitude of the people of the Transvaal, and it is to be hoped that his public-spirited action will find many imitators. Mr. Burroughes is a son of the original founder of the firm, and succeeded his father some 35 years ago. He is a traveller of great distinction, and a member of more than one learned society. His training and experience place him in the front ranks as a practical man of business also. Mr. Burroughes graduated in the work of the firm from the bench to the position which he now holds, and has therefore a practical working knowledge of all branches of the important business which he controls. He is one of the large ivory merchants of the world, his trade being particularly in African ivory. The stock of billiard balls held by the firm numbers 20,000, the material being valued at £16,000. As much as £136 has been paid by Mr. Burroughes for one elephant tusk, a fine cow's tusk giving as many as seven or eight balls. The tusk of the bull elephant, being more curved, seldom yields sufficient ivory for more than three. The coupling rings used on carriage reins, and the ivory armlets so much favoured by Indian women, are manufactured from the spare material in the course of turning the billiard balls. The headquarters of the parent house are at 19, Soho Square, London. The business was founded 70 years ago, when the game of billiards, introduced into England from Italy in 1725, was in its infancy. Strips of cloth were used for cushions, cues were made of French ash, untipped and unspliced, and the balls could not be made to travel round the table. In the early stages of the history of the manufactory the workshops were lighted by

candles, and an average output of one table a week was considered very good business. Messrs. Burroughes & Watts were the first billiard-table manufacturers to introduce rubber cushions, and they also evolved the idea of splicing the butt of the cue with ebony, to improve the balance. This idea was first carried into effect in making a cue for Cook, junior, when

MR. JAMES W. BURROUGHES.

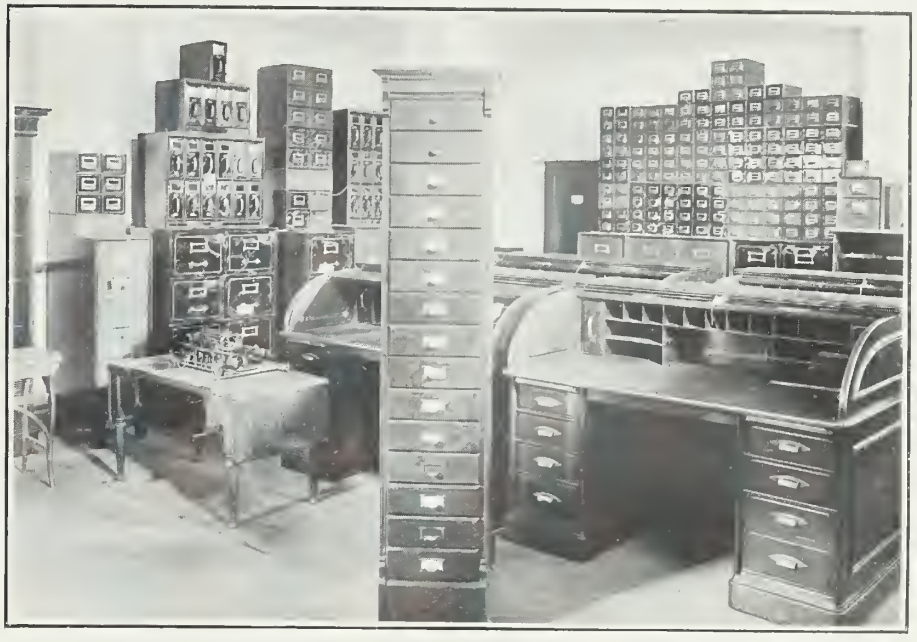
he played Roberts for the championship. The admirable results of the improvement in the cue are well known. It is from this invention of Messrs. Burroughes & Watts that the idea of splicing the handles of cricket bats was also adopted. There are now 800 employés in the factories of the firm, all the machinery is worked by electric power, and the average weekly output is about 25 large tables, and many smaller ones, as well as an average of ten tables per week for export. The timber stocked by Messrs. Burroughes & Watts is valued at £40,000. Sufficient is always kept in hand to manufacture 10,000 tables, and the timber is allowed to season for 10 years before being used. Mahogany, oak, and American walnut are the woods used. There are 13,000 more cues kept in stock than are produced by all the other makers in Great Britain, and between 200 and 300 finished tables are kept on hand to choose from. Messrs. Burroughes & Watts own four slate quarries, and some 500 slates are stocked, so as to dry thoroughly before use. It is 45 years since this firm began to export to South Africa. The headquarters in the sub-continent are at 129, Commissioner-street East, Johannesburg, the Witwatersrand capital having been decided upon as a more desirable distributing centre than any of the coast towns. The general manager of Burroughes & Watts (S.A.), Ltd., is Mr. John H. Ellis, a gentleman well known in social and sporting circles, who proceeded with Mr. James S. Burroughes to Africa in order to establish the business there on a sound footing. Branches also exist at No. 4, Castle Arcade, Durban; Main Arch Buildings, Main-street, Port Elizabeth; and at No. 29, Long-street, and Waterkant-street, Capetown. In South Africa there are also agencies in Pretoria, Bloemfontein, Kimberley, Bulawayo, Salisbury, Umtali, Beira, Chinde, Chiromo, and Blantyre. The firm's tables and specialities, as well as all appurtenances and requisites for billiard-rooms, gymnasiums, and for every form of sport, are stocked by these branches and supplied by all agencies. Over 20 finished tables are kept at the Johannesburg headquarters, from which orders can be supplied at once. The specialities of the firm are patented in all British colonies. The bonzaline and crystallate balls, tested during a long period by Mr. Burroughes himself, are considered equal to the ivory balls in excellence, the latter being of less value in South Africa, owing to their tendency to crack in the dry heat. The "Eureka" steel block vacuum cushion, now so widely used, is one of the most successful of the firm's patents, obviating, as it does, the use of wooden blocks which must be glued to the table. The fixings of the "Eureka" cushion are of steel. Other special patents are: The "M.I." portable billiard-table with slate bed and all modern improvements, which can be adjusted with absolute trueness on an ordinary dining-table; the "Cottage" billiard-table and dining-table combined, with removable leaves and lever and springs to adjust the height; and the "Government" billiard-bagatelle board, largely in use in military recreation-rooms. Requisites for cricket, football, golf, polo, tennis, lacrosse, archery, boxing, and all other athletic pursuits, are supplied in any quantity and of the highest quality by this enterprising firm throughout South Africa, and among its sporting requisites is to be found the mammoth pig-skin sphere required for the American game of push-ball.

It is hardly necessary to add that Burroughes & Watts (South Africa), Ltd., upholds the highest traditions of an old-established and justly-respected house.

THE "CAPE TIMES," LTD.

The rapid growth of Johannesburg from mining camp to modern city has helped not a little to make the history of the times. Few cities have developed so rapidly. Crude, and without the true finish which time alone can give, still Johannesburg undoubtedly justifies its claim to rank with progressive places. It is the seat of the most wonderful and fascinating industry in the world. The erection from time to time of sky-scraping commercial palaces has punctuated the rapid development of the place. The incongruity of the whole may be indeed marked, but a sure and steady sign of a great future is evinced by the continuous progress in this direction. The life of the reef itself may be long or short, but what is pretty evident is that Johannesburg is the selected home of the great financial houses which control the mining industry. Little less noticeable has been the successful efforts made by enterprising merchants and shopkeepers to keep pace with the requirements of the premier undertakings. There has been few openings for trading which have not been rapidly filled by enterprising business men. Amongst the more recent businesses which have been established on the Rand is the new branch of the *Cape Times*, Ltd., which was opened in April, 1905, for the sale of up-to-date office equipment and specialities. Commencing with premises in Mutual Buildings, Commissioner-street, the development of this particular branch was so rapid that early in the year 1906 it was necessary to remove to the larger and more convenient premises now occupied at the corner of Fox and Rissik-streets. Here the *Cape Times*, Limited, carry a comprehensive range of goods, selected from the manufactories of the best and most progressive houses in England and America. It would be impossible to select from a wider range of articles necessary to office equipment.

The typewriter during the last 30 years has become an absolute necessity to the commercial man. The typewriter trade has forged ahead, and is now recognised as one of the most progressive of all businesses. The *Cape Times*, Limited, act as sole agents in South Africa for the "Williams" Visible Typewriter. The undoubted claims of this machine have rapidly placed it in the first rank of writing machines, and the inestimable advantage of visible writing makes it essentially the most suitable machine for ordinary commercial or professional use. Recently the Williams Company have re-constructed an older model machine which was so popular in the early days, and by reason of the fact that most of the patents are time-expired this machine is put on the market at 40 per cent. less than the price of the standard model. The



"Cape Times," Ltd., Johannesburg, showing Cabinets and Desks stocked.

"Cape Times," Ltd., Johannesburg, showing Office Fittings and "Williams" Machines.

"Academy" model, as this machine is called, is now extremely popular with clergymen, travellers, soldiers, and others who desire an efficient machine, light of construction but capable of doing good work, at a price which enables one to acquire it without heavy outlay. The Elliott-Fisher Book Typewriter, which has proved so successful in the Old Country for work impossible to execute on an ordinary writing machine, is in the hands of the *Cape Times*, Limited. This machine is rapidly being adopted by various Government departments, railways, and all the great mining, banking, and insurance houses. The chief feature of the "Fisher" is the ease with which reports, balances and statements can be typewritten.

Duplicators and Supplies.—Amongst the many clever devices kept in stock by the *Cape Times*, Ltd., are "Ellams" Rotary and Flat Duplicators. These machines are exceedingly useful for re-producing hand or typewritten matter, and are largely used for circulars, notices, price-lists, &c. The *Cape Times*, Ltd., also represent all Ellams' manufactures, and supply both the trade and public with the well-known "Government Bond" carbon, and stencils and ink for all makes of duplicators. The ordinary typewriter paper, ribbons, and general accessories are chiefly of British manufacture, and it has always been the aim of the *Cape Times*, Ltd., to hold British stocks when possible.

Modern Business Systems.—The most important feature of the *Cape Times* stock consists of "Business Systems." As sole agents for the Rockwell-Wabash Co., of Chicago, and the Art Metal Construction Co., of Jamestown, New York, the *Cape Times*, Ltd., are enabled to carry a complete stock of the most up-to-date devices for filing documents and keeping records. The growing importance of accurate filing and rapid reference is one of the most noticeable features of modern business. Attention to detail demands the scientific handling and treatment of correspondence and other documents. "Systems" as applied to mines, banks, insurance, and general offices, necessitate the installation and maintenance of the most suitable filing devices.

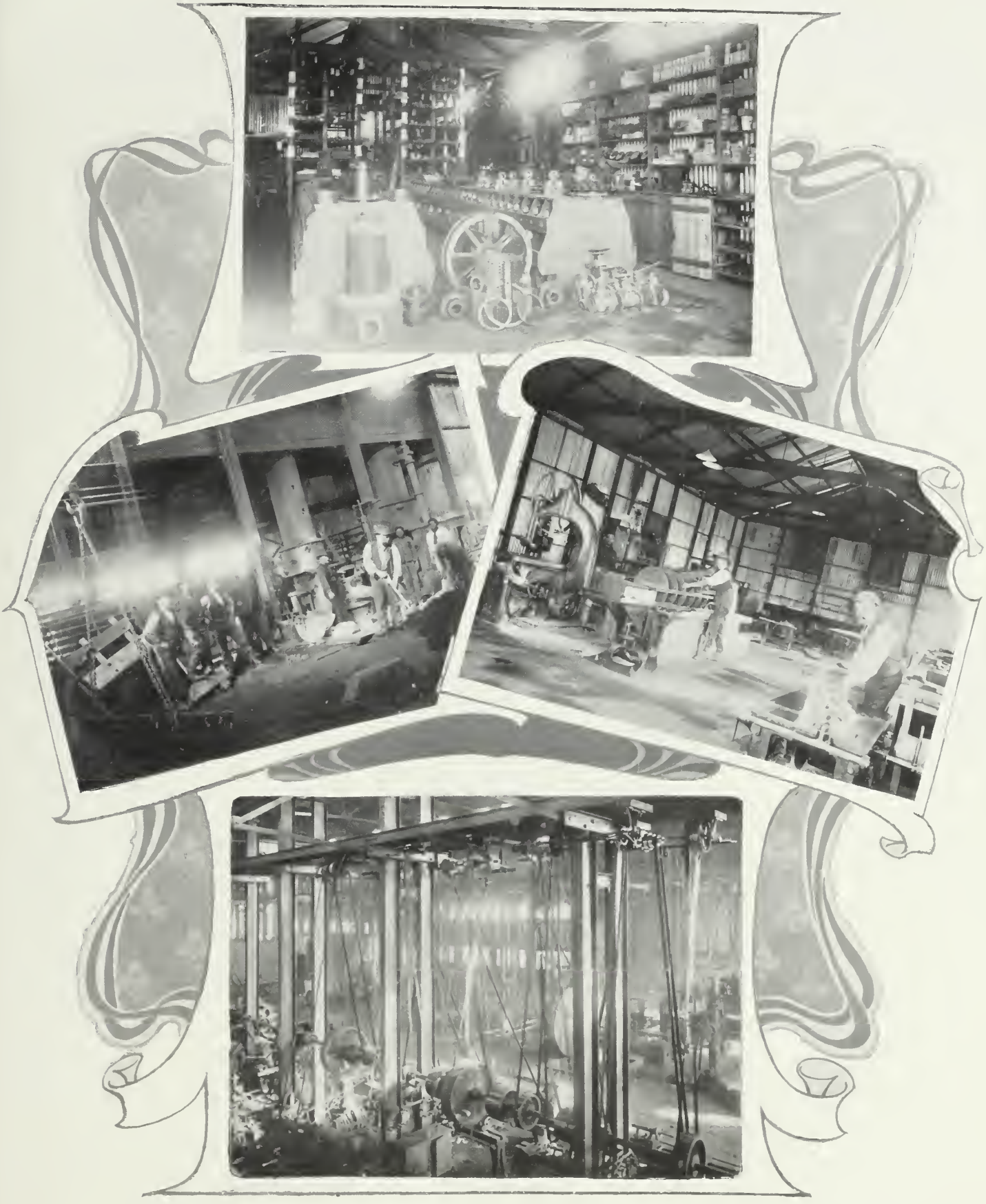
The *Cape Times*, Ltd., not only sell furniture and fixings, they do something more. They devise systems which will suit any business. All that is necessary is to show the *Cape Times*, Ltd., what you want to do, and they will immediately show you free of charge some practical idea, in tangible form, which can be adapted to meet any special need. Follow-up systems of advertising are demonstrated by the *Cape Times*, Ltd., and when adopted they never fail to bring satisfactory results. Card index systems of all kinds are installed, and a large stock of cards and guides for any system is carried.

"Cape Times," Ltd., Johannesburg (another Interior View).

Amongst recent innovations one which is claiming the serious attention of those interested in office equipment is that of art metal furniture. Steel replaces wood in nearly every item of office furnishing. When taking the agency for this class of goods the *Cape Times*, Ltd., made it possible to obtain in South Africa a line which is little known even on the English market. Fire resisting, and impervious to the ravages of insects, steel furniture bids fair to replace wood in the equipment of all important business offices. The *Cape Times*, Ltd., are showing a fine stock of goods of this manufacture, and are prepared to design and estimate for any description of work. A visit to the showrooms of the *Cape Times*, Ltd., will repay anyone interested in modern, time-saving devices.

Messrs. HUBERT DAVIES & SPAIN.

The firm of Messrs. Hubert Davies and Spain holds an important position among the commercial houses of the Transvaal—and, indeed, of South Africa. They installed the first electrical plant on the Rand in 1889, at which date Mr. Davies himself personally superintended the erection of machinery for the lighting of the mill at the Jumpers Gold Mine. This innovation was followed by a similar installation on the Simmer and Jack mill, the motive power in each case being supplied by two 8 K.W. 65-volt dynamos. Electricity was utilised for illuminating purposes only along the reef for the succeeding two years, and then in 1891 an electrical pumping plant was placed upon the Champ d'Or property. This consisted of a series wound continuous current dynamo and motor at 300 volts, the transmission line being a mile long. It is interesting to know that the machinery then installed is still in use. In the following year several 500-volt direct current transmission plants were erected on the Witwatersrand, and the first lighting plant for the town of Johannesburg was also installed. This latter comprised Willans and Robinson high-speed engines coupled direct to Electric Construction 30 K.W. single phase 50-cycle 2,000-volt alternators. One of the illustrations of this article shows the number of these sets at the station. Distribution was effected at 2,000 volts, and separate transformers



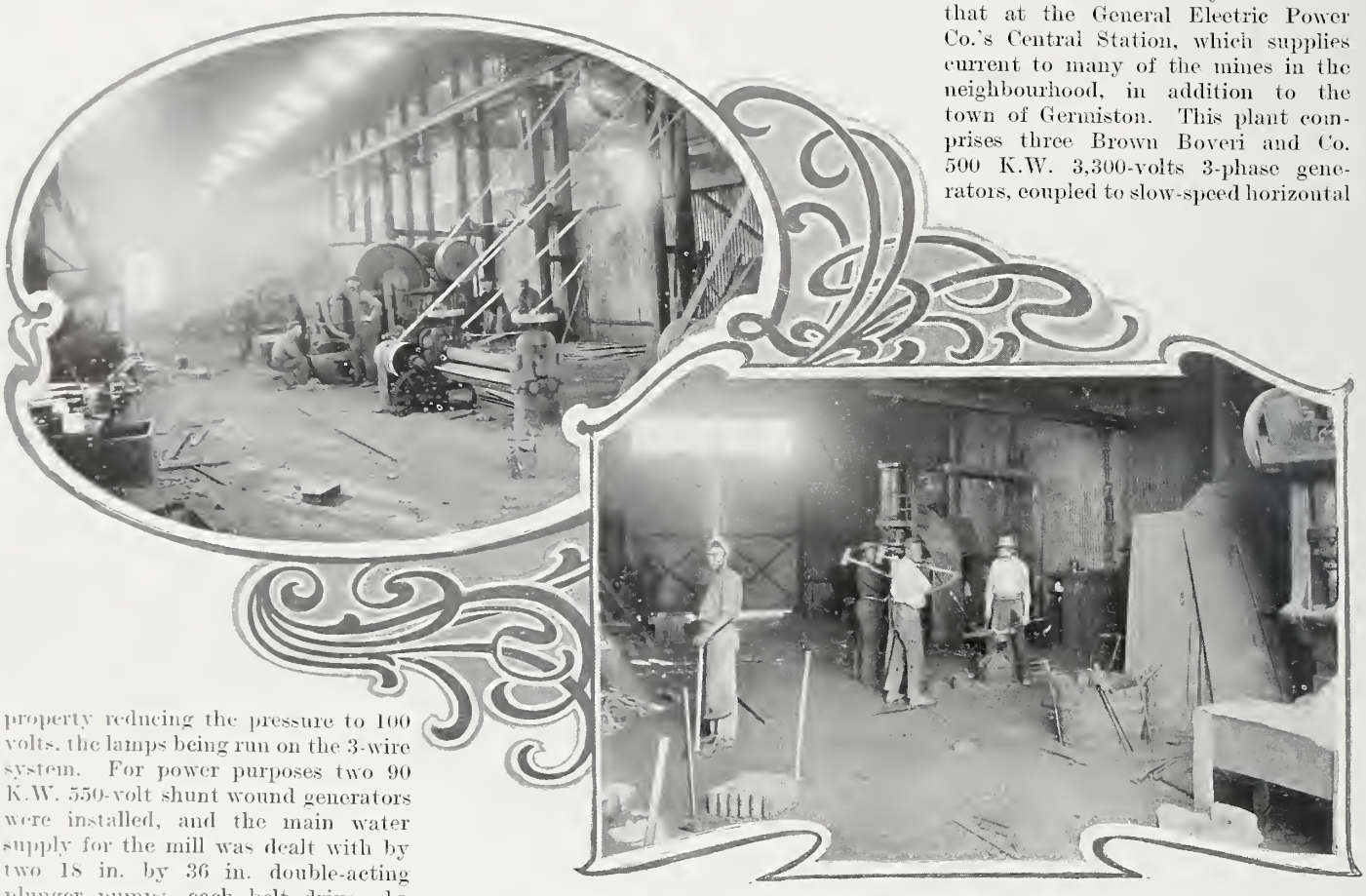
WORKS OF MESSRS. HUBERT DAVIES & SPAIN, JOHANNESBURG.

were constructed on the premises of each consumer, reducing the pressure to 100 volts. By this time the new power was being extensively used on the mines for pumping and hoisting—both on the surface and underground—and pumping gear with capacities of up to a 500 ft. lift was being introduced. Early in 1893 the firm whose business is under review installed on the Crown Reef an electrical plant which was at that time by far the largest on the Rand. The lighting for surface and underground was provided for by two 30 K.W. 2,000-volt alternators with transformers at various points on the property reducing the pressure to 100 volts, the lamps being run on the 3-wire system. For power purposes two 90 K.W. 550-volt shunt wound generators were installed, and the main water supply for the mill was dealt with by two 18 in. by 36 in. double-acting plunger pumps, each belt driven by a 95 B.H.P. shunt wound motor. A number of smaller pumps were supplied for underground work, and also motors for driving the plant in the workshops, cyanide works, etc. The mill on this property is situated at about one mile from the mine, and the rock is trammed to the former by means of two 500 volts electric locomotives. The whole of this plant is still in operation, and to the success achieved when it was first installed was largely due the rapid development in the use of electrical plant during the next two years.

During 1894 and 1895 large plants were installed by the firm, and of these only a few of the more important can be mentioned.

At the Geldenhuis Estate the generating plant comprised three 110 K.W. generators at 550 volts, at which pressure motors on the surface were supplied, and two 30 K.W. direct-current rotary transformers were provided, reducing the pressure to 220 volts for mine pumping and lighting.

On the New Modderfontein G.M. Co. four 60 K.W. 125 volt direct-current generators were installed, supplying current on the 5-wire system for a large number of motors.



Works of Messrs. Hubert Davies & Spain, Johannesburg.

Other large generating plants include those on the Paarl Central (three 60 K.W. generators), at the New Comet (two 220 K.W. generators working on the three-wire system), and on the New Kleinfontein (220 K.W. generators). At the above mines electrical power is almost exclusively used for pumping purposes, including supply, return water, and nine pumps.

Where water power was available it has been utilised for electric transmission plants, including the Day Gold Mine and Forbes Reef Mines 1,000-volt continuous current plant, and at the Pigg's Peak Mine (Barberton district) a 150 H.P. 3,000-volts 3-phase plant—in each case the power being used for mill driving and other work.

The Pigg's Peak plant was the first instance of the 3-phase system being used in South Africa, and shortly afterwards Mr. Hubert Davies introduced this system on the Rand at the Spes Bona Mine, where the plant consisted of two 75 K.W. 1,100-volts generators and about 150 H.P. in motors of various sizes.

The largest of the many plants installed on the Rand by the firm is that at the General Electric Power Co.'s Central Station, which supplies current to many of the mines in the neighbourhood, in addition to the town of Germiston. This plant comprises three Brown Boveri and Co. 500 K.W. 3,300-volts 3-phase generators, coupled to slow-speed horizontal steam engines, and a large number of high-lift mine pumps and motors for various purposes.

Other 3-phase plants include the Driefontein and Angelo Joint Mill four 100 K.W. belt-driven generators and one 100 K.W. generator coupled to a Bumsted and Chandler high-speed engine. Current is here generated at 550 volts, and all the motors on the mine are run at this pressure, transformers being used for lighting purposes. From this station power is also transmitted to two distant pumping stations at a pressure of 2,000 volts,

one at the Kleinfontein dam four miles distant, which comprises two 16 by 18 three-throw pumps each driven by a 100 H.P. motor, and one at the Boksburg dam two miles distant, where two 9½ by 12 treble-barrel pumps belted to 50 H.P. motors were installed.

At the Rietfontein "A" two 60 K.W. belt-driven generators, and the Porges and South Randfontein four 50 K.W. 3-phase generators, each direct, coupled to a Bumsted and Chandler high-speed engine, were provided, for supplying electric power for pumping and other purposes.

Of the town lighting plants equipped by the firm in addition to the Johannesburg Central Station referred to above, may be mentioned those at Pretoria, Kroonstad, and Ladysmith, all continuous current stations. At Pretoria there are three 120 K.W. Electric Construction Co. continuous-current generators coupled to Bumsted and Chandler engines and two 200 K.W. sets. This station runs on the 3-wire system with 500 volts between the outers. At Kroonstad two Willans Electric Construction Co. 60 K.W. sets, with boosters coupled to a generator shaft and accumulators for 230 volts circuit, were installed. The Ladysmith station is run on the 3-wire system, and the generating sets comprise Willans engines, each direct coupled to two 250-volt Electric Construction Co. generators. Messrs. Hubert Davies and Spain have also carried out a large contract for the War Office for lighting the military cantonments at Middelburg. There the plant comprises three direct-coupled sets similar to those at Ladysmith; the whole of the distribution is carried out by underground cables, and upwards of 3,000 lights have been installed in the cantonment buildings, in addition to street lighting, which is done through the medium of Nerst lamps. The Pretoria Printing Works are also being equipped with a large number of electric motors supplied by the firm.

FEDERAL SUPPLY AND COLD STORAGE COMPANY OF SOUTH AFRICA, LTD.

Where a great industry, like the gold-mining of the Rand, suddenly springs into being in the centre of a country which has previously been only very sparsely peopled, the question of the necessary food supply for a large influx of population assumes a position of urgent importance. Half a century ago it would have been a very hard matter to provide the necessaries of life at any price to a few hundred thousand people in the Transvaal. To-day, thanks to the facilities afforded by steamers specially fitted up for the purposes of the African live and dead meat trade, to the improved unloading machinery at the outports, and to the supercession of the old bullock wagon by the locomotive, it is possible to adjust the supply of even such a perishable article as meat to the daily requirements of customers,

Highland Line Steamer unloading Carcases at the Wharf, Durban.

Freezing Works, Durban.

FEDERAL SUPPLY AND COLD STORAGE CO. OF SOUTH AFRICA, LTD., JOHANNESBURG.

Interior Retail Department, Braamfontein, Johannesburg.

Doornfontein Branch.

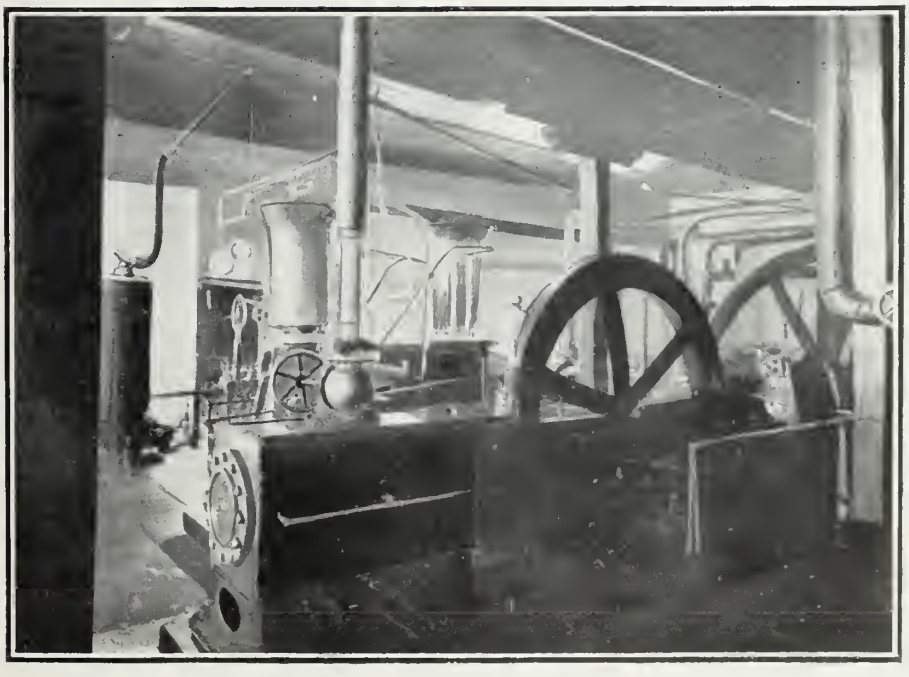
Jeppestown Branch.

separated by many thousands of miles from the pasture lands of South America or Australasia, where, in its live state, most of the meat consumed in the Transvaal had its origin.

There are, indeed, few things more marvellous in their way than the wonderful organisation by which, in modern times, the people of a large town find their daily wants supplied to a nicety without friction; and without, in the ordinary course, either a perceptible deficiency or a wasteful excess. All this is the outcome of what may be called specialised private enterprise. No development of official bureaucracy, or of communistic or socialistic organisation which the world has ever known, has found it practicable to meet the daily wants of the people as they arise, without violent alteration of deficiency and excess, accompanied by heavy loss to all concerned.

Some such considerations as these naturally occur to the most superficial observer when contemplating the operations of the Federal Supply and Cold Storage Company of South Africa, Limited. This concern, which has a capital of £500,000, has its registered South African office at Capetown, with branches and agencies at Durban, East London, Johannesburg, Pretoria, Bloemfontein, and the principal centres of population throughout South Africa. The principal office for the Transvaal is at Braamfontein, Johannesburg. The Company was formed on January 1st, 1903, and then took over a number of private businesses previously established at Durban, East London, Bloemfontein and Capetown. It was at this time also that the very important business carried on by those well-known meat-purveyors, Messrs. Angehrn and Piel, at Johannesburg, was acquired. Under the control of the Johannesburg branch there are no fewer than 25 sub-branches, extending from Springs to Potchefstroom. The Pretoria business also controls various branches radiating from the capital centre, but is of more recent origin, having been established about 18 months.

The Transvaal Headquarters of the Federal Supply and Cold Storage Company of South Africa, Ltd., Braamfontein, Johannesburg.



Engine Room, Durban.

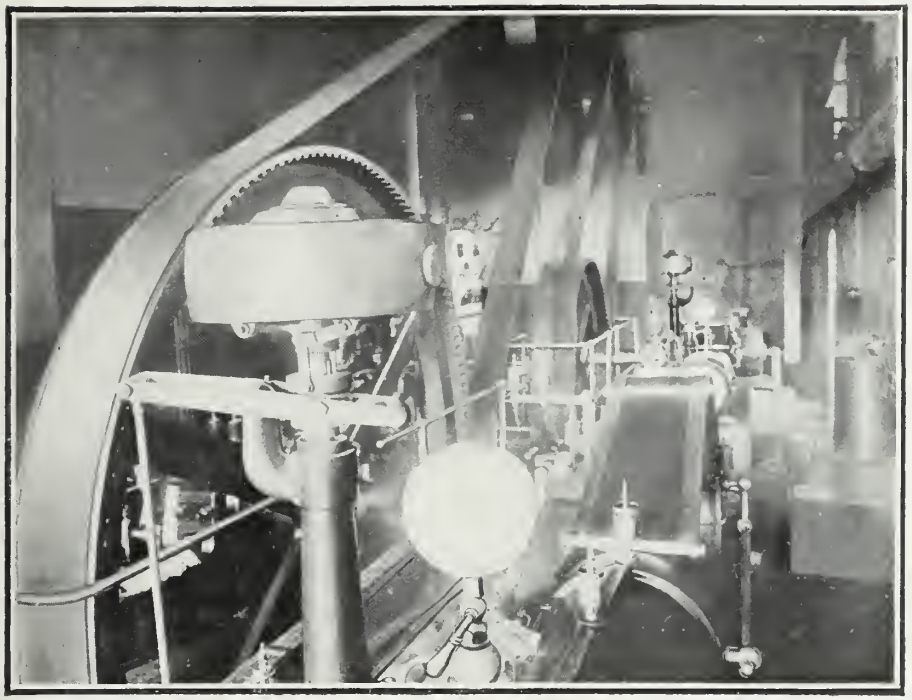
Mr. Adolf Angehrn has been recently appointed managing director of the Company's affairs in South Africa, his late partner, Mr. Piel, mainly devoting his attention to the Company's transactions in the Transvaal. Mr. Owen Roberts, the Company's accountant for the Transvaal business, is stationed in Johannesburg, together with Mr. J. L. Sater, the engineer of the Company. The storage capacity at Johannesburg is about 36,000 cubic feet, which is about the same as that provided at Pretoria, where the Company has installed one of the most complete cold storage plants in South Africa.

In addition to the ordinary cold storage business the Company does a large trade in fresh meat, buying up cattle in the Transvaal, Natal, and Orange River Colony. These cattle come up by train and are killed at the Company's slaughteryards, outside of Johannesburg. This meat does not go into the cold storage chambers, but passes at once to the consumers through the various retailers. Nearly all the frozen meat handled by the Company

FEDERAL SUPPLY AND COLD STORAGE CO. OF SOUTH AFRICA, LTD., JOHANNESBURG,

Pretoria Chief Depôt and Works.

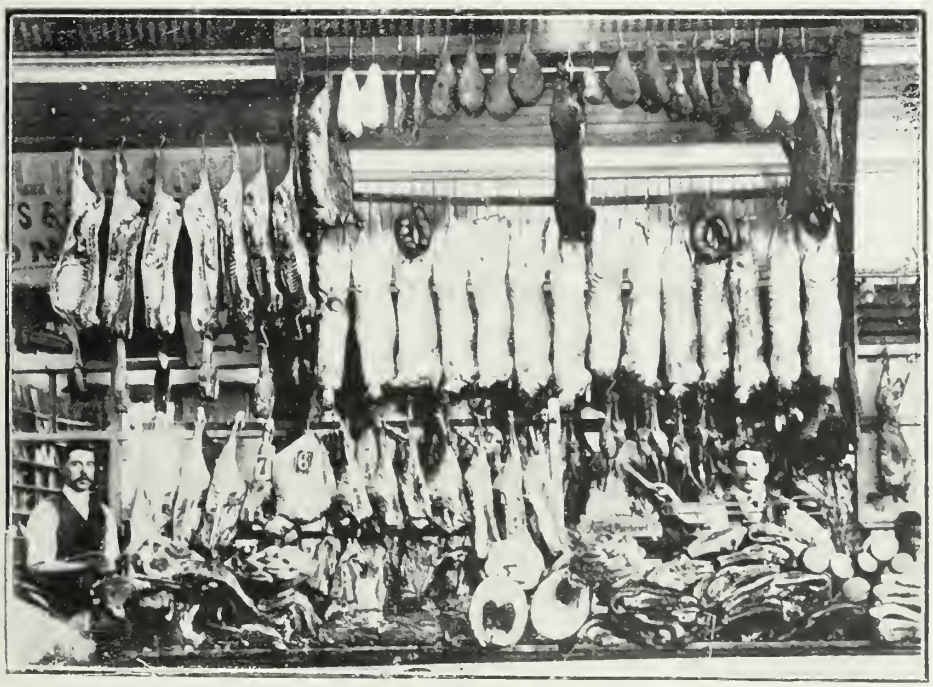
Interior Retail Department, Chief Depôt, Pretoria.



Machine Room, Braamfontein, Johannesburg.

comes from America and Australia by the Highland boats of the well-known Nelson line of steamers. These vessels call at Capetown on the inward voyage, and subsequently at East London and Durban. The latter is, under ordinary circumstances, the port of discharge for the meat destined for the Transvaal trade; but occasionally, when an emergency arises, a portion of the cargo is intercepted either at Capetown or East London, and sent on by rail to the Transvaal.

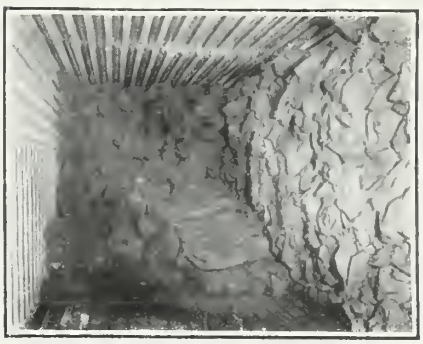
The importance of the industry may, to some extent, be gauged by the fact that of the total consumption of animal food in the Transvaal quite seven-tenths consists of imported meat, and that at Johannesburg alone the



Retail Department.

Company provides constant employment for one hundred Europeans and as many natives, whilst at the Pretoria branch work is found for a considerable number in addition.

The refrigerating plant at headquarters, Braamfontein, is by A. Borsig. It is on the sulphur di-oxide compression system, and has a capacity of 15 tons. This plant is the only one of its kind in South Africa. The circulation of the freezing agent is of a double character. Brine is circulated at a temperature of zero, through pipes in the refrigerating rooms. The pipes absorb the heat in the chambers, and lower the temperature to from 15 to 20 degrees Fahr. There is likewise what is known as the cold air system. The air is drawn out of the rooms by the suction of a fan, and driven through an enclosed tank, where there is a constant flow of dripping brine at a temperature of zero, and is forced through shoots back into the rooms.



Interior of Cold Storage Chamber, Durban.

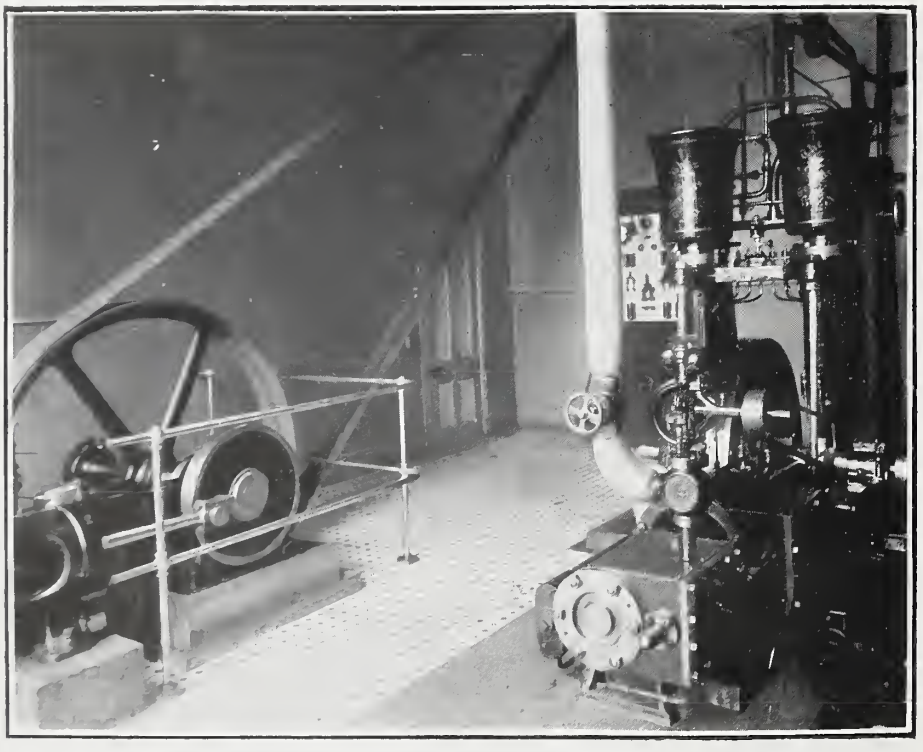
This keeps the rooms supplied continually with fresh air, and preserves the meat and other produce. In the basement of the building there is a space capacity of about 20,000 cubic feet, and a mechanically-driven lift, of two tons capacity, is used for lowering and raising the produce stored there.

The refrigerating plant at Pretoria is by C. A. McDonald—"The Hercules"—and is on the direct expansion of ammonia system, with a capacity of 18 tons. The freezing agent in this case is different to that at Braamfontein. Instead of the brine circulating through the pipes, ammonia is circulated. The heat is in this way absorbed in the rooms, and the temperature is frequently brought down to zero. Special attention has been paid to the insulation of the cold chambers. The plant and premises generally, of which illustrations are given, are among the

Motor Vans for Distributing.

best—if not being the best—in South Africa.

The management may fairly be congratulated upon the completeness of the Company's organisation, and the enterprise which they have shown in their various departments. The operations of the Company are very extensive, and will be doubtless still larger in the near future. Altogether its outlook is extremely promising. Considering the advantages offered to the public, the Company should receive that further measure of support which its operations and enterprise merit.



The Machine Room, Pretoria.

THE FEDERAL TOBACCO WORKS.

The Federal Tobacco Works, which are conducted by a private company, came into existence towards the latter part of 1902, and they now occupy the premises of the old "Atlas" Tobacco Factory. A complete installation of new machinery has been put in, comprising all the latest English and American inventions, and the factory is now as well equipped for its size as any in the world. At any rate, it will compare most favourably with any other establishment of its kind in South Africa. Although only a young firm, it occupies a prominent position in the tobacco industry, and the business has increased so much of late that it has been found necessary to extend the premises. In the course of an interesting interview with the firm's manager we ascertained that they make a speciality of their cigarettes, and two of their brands, "Feds" and "Luxury," they claim are known from the Cape to the Zambesi. These are manufactured from the finest Virginian leaf, and it is only by the employment of the latest labour-saving appliances that they are able to turn out such a remarkably good article at the price and yet make a profit. They also manufacture a plug tobacco which is practically unique, while their Irish twist is equal in every respect to the imported article. Another speciality is their Turkish cigarettes, which are made from real Turkish tobacco, and are in some respects superior to those imported, seeing that the latter deteriorate with keeping, and are not improved by having to come such long distances before passing into consumption. They are also well known for their Transvaal tobacco, which is sold in the form of various smoking mixtures. At the present time the firm is interesting itself in experiments having for their object the improvement of the quality of the locally grown tobacco. If anything like as good a product as that grown in America could be obtained here, there would be an enormous saving in the price of cigarettes, as at present all the tobacco used in making them has to be brought from America. Principally owing to the presence of phosphates in

FEDERAL TOBACCO WORKS, JOHANNESBURG.

the soil, the finer kinds of tobacco cannot be grown here, although it is hoped in time that this may be remedied. It is purely a question for the tobacco-grower; but once he can produce a first-class article there is practically an unlimited market for him to supply. Mr. A. W. Jay, the manager of the works, is considered one of the finest tobacco experts in South Africa.

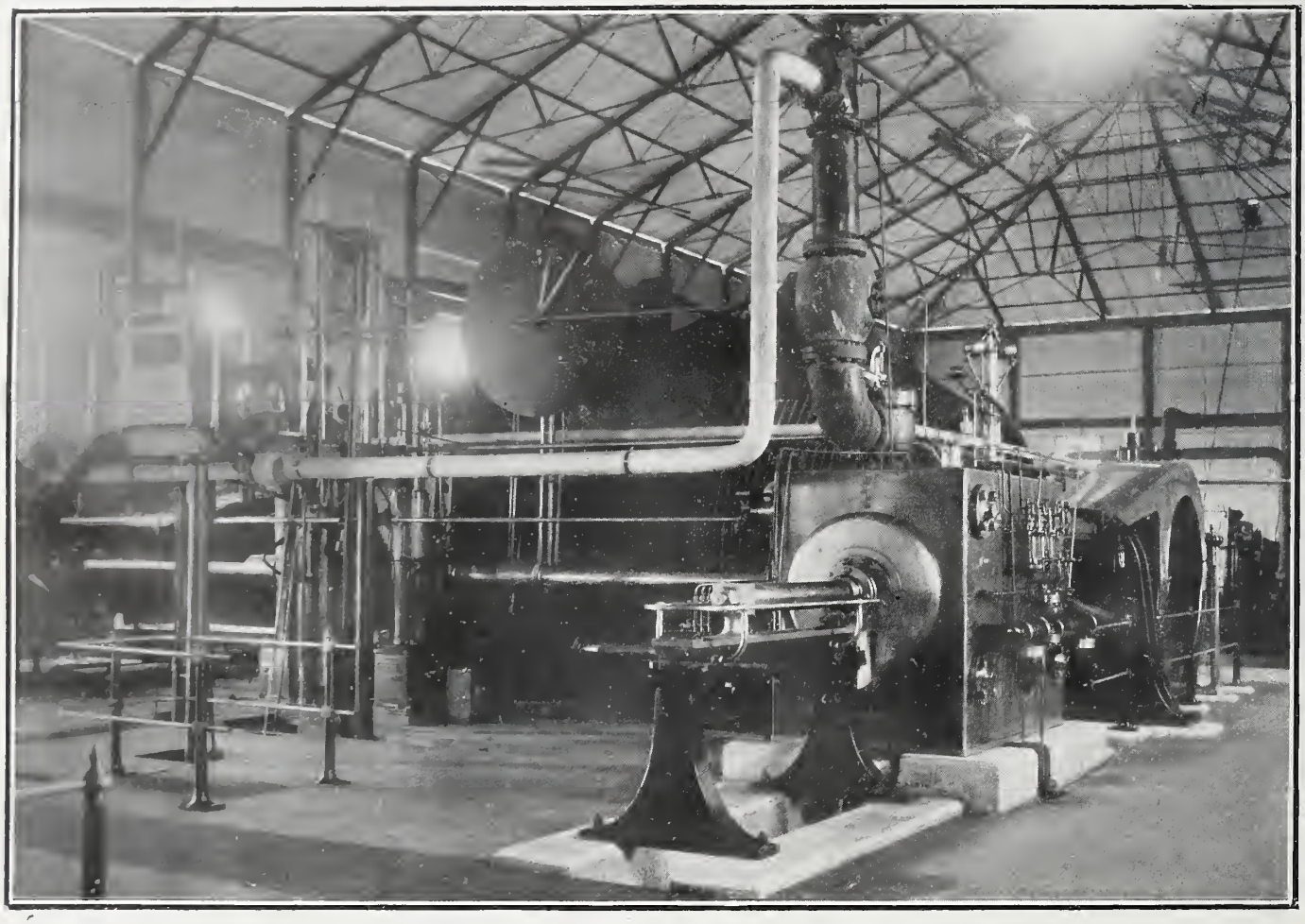
FOWLER AND MACLACHLAN.

Messrs. Fowler and MacLachlan, of Howard Buildings, corner of Main and Loveday Streets, Johannesburg, although a comparatively new firm in town, are controlling considerable interest here—namely, those formerly represented by the late firms, Howard Farrar and Co., and the British Engineers' Alliance, Ltd. As a matter of fact Mr. Fowler was chief engineer, and Mr. MacLachlan was the leading business man—under the managing director—of the British Engineers' Alliance, Ltd., which is now no more. It will therefore be seen that, as successors to the above firms, they are by no means new, but they have acquired a substantial business,

to which they have added several agencies and some important features. Among other firms Messrs. Fowler and MacLachlan are representing the following British manufacturers:— Messrs. Hick Hargreaves & Co., Ltd., Corliss engines and Lancashire boilers; Messrs. Ruston Proctor and Co., Ltd., engines, boilers, stamp mills and centrifugal pumps; Messrs. Walker Bros. (Wigan), Ltd., patent air compressors; Messrs. Hayward-Tyler and Co., Ltd., pumps and hydraulic machinery of all kinds; Messrs. Jessop and Appleby Bros., Ltd., steam, electrical and hand cranes; Messrs. Lee and Hunt, machine tools; Messrs. D. H. and G. Haggie, wire ropes; the Chatwood's Patent Safe and Lock Co., Ltd., safes, &c.; Messrs. Joshua Heap and Co., Ltd., screwing machines; Messrs. Sanderson Bros. and Newbold, Ltd., steel shovels, &c.; Messrs. Tasker Sons & Co., Ltd., leather and rubber belting, packing, &c.; the Harris Patent Feedwater Filter Co., Ltd., water purifiers and filters. In addition to the above the firm are local agents for the Transvaal for Kynoch, Ltd., Birmingham, the well-known manufacturers of high explosives, and are at present carrying important contracts for spot and forward supplies of their specialities. Messrs. Kynoch, Ltd., have their own magazines at the coast, in which they carry a stock of some 6,000 cases. Their present output on the Rand averages 3,000 cases per month.

In connection with the firm of Chatwood's, it will be of interest to know that the two large treasuries and all the strong rooms and fittings in the new Corner House (Messrs. H. Eckstein and Co.) were installed by this firm. The magnitude of the work may be imagined when it is realised that this building consists of nine stories, forming one of the principal landmarks of Johannesburg.

Besides the above work Messrs. Chatwood's also supplied the strong-room doors for the new Johannesburg Stock Exchange.



WINDING GEAR SUPPLIED BY MESSRS. FOWLER and MACLACHLAN.

Another important agency which demands special reference is that of Hick Hargreaves & Co., Ltd., who are the makers of the largest Corliss mill and winding engines in the world. Many of the Rand mines have been supplied with these, amongst others the East Rand Proprietary and Kleinfontein Groups. An illustration of one of these engines will be found in this work.

The London representation is in the hands of Messrs. F. A. Robinson and Co., who were the agents of the British Engineers' Alliance, Ltd., therefore the technical and commercial interests of the new concern are thus, to all intents and purposes, in the same hands as before, both in the Transvaal and London.

THE FRENCH TOILET AND HAIRDRESSING SALOON.

Johannesburg is well provided with most of the comforts of life. It is surprising, in fact, to find how the city has advanced in this direction during the last few years. One of the first indulgences of the ordinary traveller on arriving at his destination after a long and fatiguing railway journey is to visit a well-appointed toilet saloon. No better establishment of this class can be found in the city than the French Toilet and Hairdressing Saloon, which is situated in the Royal Arcade, and which was opened in 1904. It is run on the very latest hygienic principles, each assistant, of which there are 10, wearing appropriate costumes, and having their hands gloved afresh for each customer. This well-appointed saloon has just been fitted with an apparatus, the invention of Mr. Cohen, the proprietor, for spraying the customer with cool perfumed air, a luxury not to be met with in any other saloon in Johannesburg. Another innovation on the part of the proprietor is the Vibra Massage machine, which is used for face and scalp massage to promote growth of hair. The attendants employed are all artists at their work, and those patronising this establishment will not be disappointed.

THE FRENCH TOILET AND HAIRDRESSING SALOON, JOHANNESBURG.

MESSRS. GABRIEL & BALLANTINE.

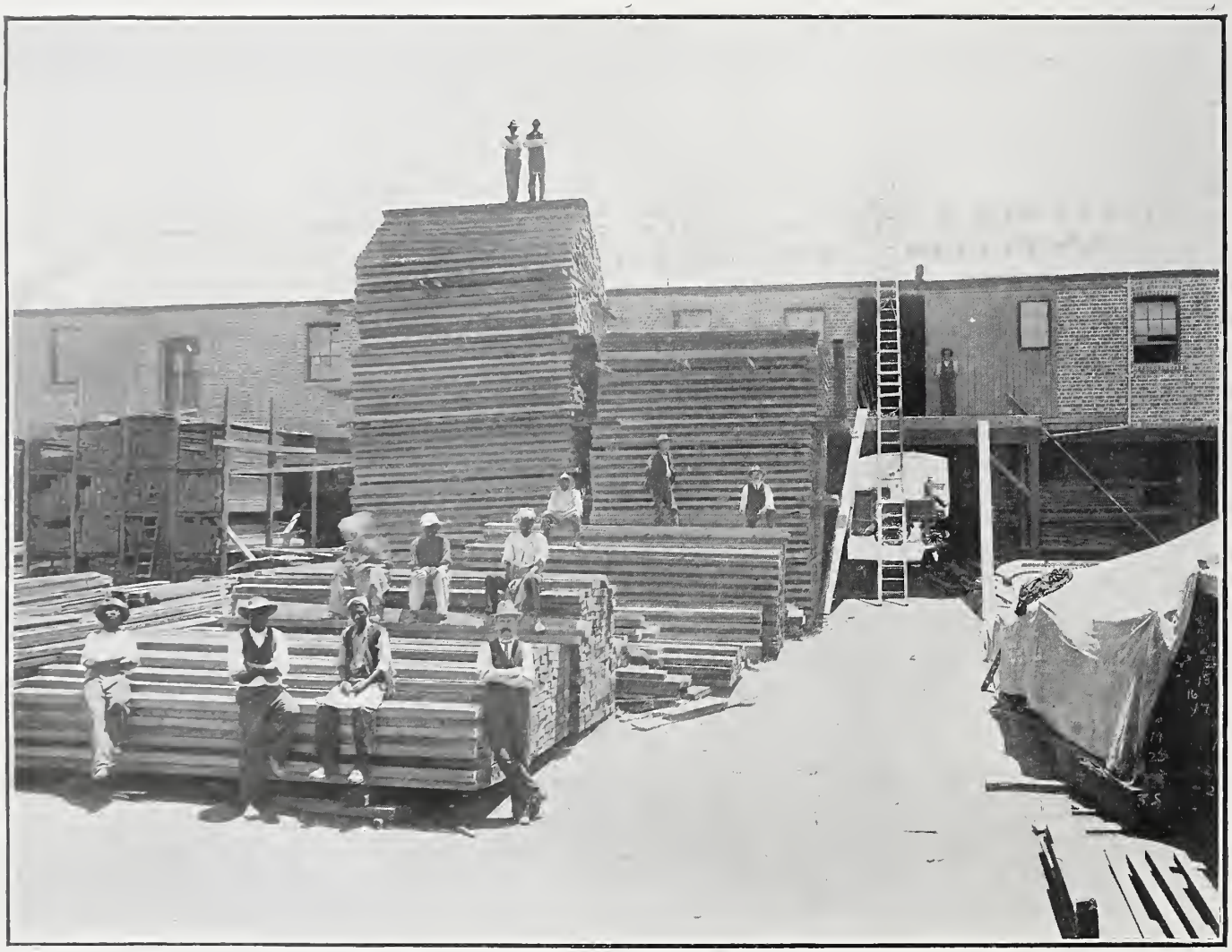
The business conducted by Messrs. Gabriel & Ballantine, timber merchants and contractors, Johannesburg, had its commencement some eighteen years ago—in the earliest Witwatersrand camp—at which time Mr. Colin Gabriel, the senior partner of the present firm, commenced business as a contractor on the site now occupied by the Hotel Dudley. In 1895 Mr. Wm. Ballantine joined the firm as partner. Messrs. Gabriel & Ballantine, whose business has considerably increased since its inception in the early days of the Golden City, have now large works in Von Weilligh-street South, where modern sawing, moulding, and planing machinery keeps a large staff of employees engaged. The business block of the firm consists of a two-storey building which covers a space of 140 ft. by 35 ft., and the yards are of considerable extent. All joinery work is done here, power being supplied by electricity and steam. The firm holds agencies for the well-known "Canton" steel ceilings, cornices, mouldings, &c., of artistic design and pattern, and

MR. GABRIEL.

large stocks which are kept cover every variety. Messrs. Gabriel & Ballantine are in a position to produce every sort of cornice, skirting, or panels, moulds, dado, or picture rails. Their moulding department can adequately deal with newels, balusters, finials, handrails, circular panels, or anything that may be required in that direction, to whatever design. In addition, the joinery trade is supplied, and flooring and ceiling woods, pine, teak, galvanised iron, and builders' sundries are available from their stocks. The workshops and yards, it may be mentioned, cover an extent of nine stands, and additional two stands were acquired some time ago by the firm for erections to accommodate 100 native workmen. Important contracts executed by the firm have their finality in numerous prominent buildings to be seen in the new Johannesburg. Among others may be mentioned the premises of the Standard Buildings, Harvey, Greenacre & Co.'s, Cuthbert's Buildings, Saeke's Buildings, Steytler's Buildings, New Empire Theatre, National Mutual Buildings of Australasia, and the United Building Society block. Included in

MR. BALLANTINE.

those of earlier date may be enumerated the telephone tower (one of the landmarks of the older town), the Consolidated Buildings, the Gaol, and the



YARD OF MESSRS. GABRIEL & BALLANTINE'S JOINERY WORKS, JOHANNESBURG.

premises of Messrs. Paddon & Brock. In Pretoria, buildings on which Messrs. Gabriel & Ballantine carried out contracts include the Transvaal Mortgage and Finance Buildings, the Soldiers' Institute, and the official residence of the General commanding His Majesty's troops.

GENERAL FIRE APPLIANCES CO., LIMITED.

In these days of huge warehouse and office buildings, protection against fire is one of the most vital considerations, and in this connection the General Fire Appliances Co., Limited, play a prominent part in the supply and erection of fire appliances suitable for

Premises of the General Fire Appliances Co., Limited, Johannesburg.

all cases and calculated to give the best results under all conditions. This firm, which has its Johannesburg store, offices, and show-room at 119, Marshall-street, represents some of the leading English and American manufacturers of fire appliances. A few of their specialities may be enumerated as follows:—

The Gamewell Fire Alarm.—This is a street alarm which years of experience and experiments have brought to a state of perfection. Boxes are fixed in the principal thoroughfares, and by pulling a hook in these boxes an alarm is given in the fire station, and at the same time the number of the box from which the alarm emanated is registered on the fire station indicator, thus enabling the Brigade to get away at once to the box, and thence to the fire. This alarm is protected by numerous patents, and all its details have been carefully considered, and where possible, improved, until to-day it stands unequalled. It is so arranged that when the alarm box is not actually open and in operation, it is cut off from the circuit, and is thus free from danger by lightning, &c., and also incapable of giving false alarms to the fire brigade. It is largely used throughout the U.S.A. and Canada, and has recently been introduced into the United Kingdom with every success. In South Africa the value of this system is being recognised every day, and it has been adopted by the following towns: Johannesburg, Pretoria, Capetown, Bloemfontein, and Kimberley. The question of installing this system is also being considered by the municipalities of the coast ports. It has already been largely adopted by the Central South African Railways, and on the mines.

Gamewell Auxiliary System.—For large public buildings, hospitals, hotels, &c., this system is a useful adjunct in connection with the Gamewell system. It is fitted up inside the buildings, small boxes being distributed on the various floors, from which an alarm is given to the fire brigade through the nearest street box. This system has been installed in the following important buildings:—Johannesburg Hospital, Pretoria Asylum, Palace of Justice, Government Buildings, Government Printing Works, Pretoria, and others.

Vajen-Bader Smoke and Fume Helmet.—This helmet is a perfect protection against smoke, gases, and fumes of every sort. It is especially adapted for use in mines, cold storages, breweries, fire brigades, &c. The helmet is fitted with a cylinder which contains sufficient air to supply the wearer for one hour, and if desired, cylinders to contain sufficient air to last three hours can be fitted. It is in every way thoroughly up-to-date, and is perfect in all its details. The total weight of the helmet complete is only 6 lbs., and the weight is carried on the shoulders; it can be put on in a minute, and as the cylinder will retain pressure for months, the helmet is always ready for service. It has already been largely adopted on the mines in the Transvaal and Natal, and we may mention that two of these helmets were telegraphed for and used to recover the bodies at the disaster which occurred at Vereeniging. It has been approved by both medical and mining authorities, and is undoubtedly an appliance which should be of great service in all callings where smoke, fumes, or gases have to be contended with.

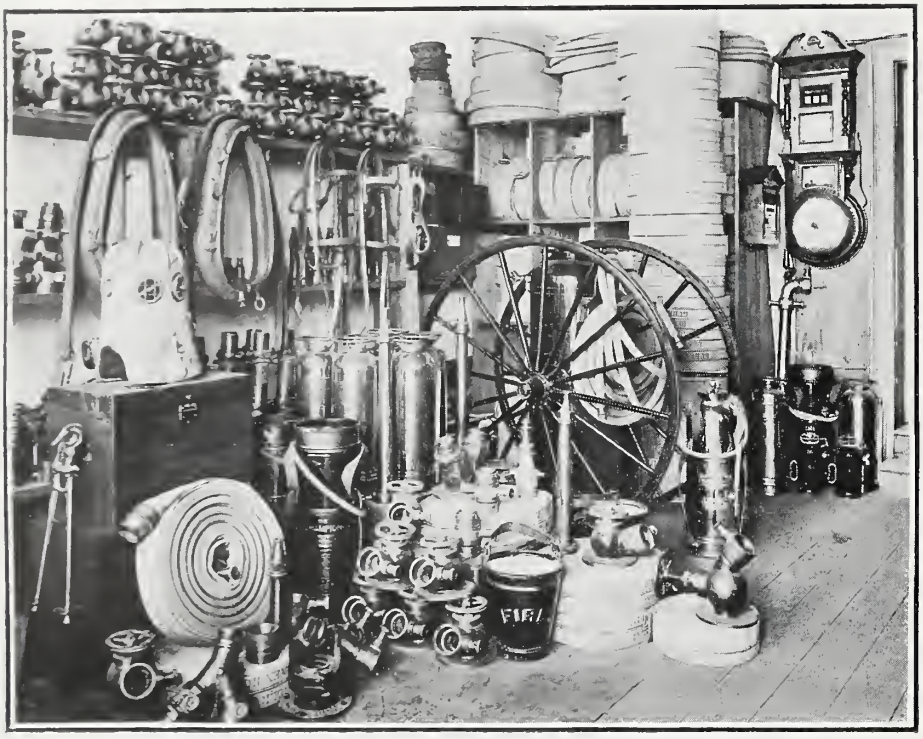
Automatic Sprinklers.—The automatic protection of buildings against fire has been largely adopted during the last 20 years, and this is only natural when the great success of the device here mentioned is considered. Hundreds of fires are extinguished annually in all parts of the world, at an average loss of less than £100 per fire. If such dangerous risks as cotton mills, corn mills, &c., are left out, the average price per fire in stores, offices, buildings, &c., does not exceed £30.

Insurance companies everywhere fully appreciate the advantages which are derived from "sprinkler" protection, as the rebates which they allow easily prove. In South Africa a rebate of 30% is allowed on all risks protected with automatic sprinklers and hand appliances. The General Fire Appliances Co., Ltd., who are the proprietors of an automatic sprinkler,

make a speciality of sprinkler protection, and they have installed numerous buildings, principal amongst which we would mention the General Post Office, Johannesburg.

Chemical Engines.—The 40-gallon "Champion" Chemical Machine is one of the most useful and effective machines introduced into South Africa. It is compact and easily run about, and is especially adaptable for the mines and isolated districts where water is not plentiful. It is operated without difficulty, and has been largely adopted by the mines along the Reef.

The May-Oatway Automatic Fire Alarm.—The Company has recently taken up the May-Oatway alarm, which should prove as big a success in South Africa as it has been in the United Kingdom. It is probably the best alarm of its kind at present on the market, and has been found so successful on numerous occasions that the Fire Offices Committee considered the question of allowing a rebate on all buildings in which it was fitted. Immediately a fire breaks out an alarm is given and the exact position of the outbreak is recorded on the indicator board which is fitted in every building. At the same time an alarm is automatically given to the fire station, thus ensuring the arrival of the fire brigade at the earliest possible moment. The principle on which the May-Oatway alarm is designed makes it practically impossible for it to fail from any cause whatever. It certainly appears to be a device which should appeal to all who wish to secure their property against damage by fire.



Interior of Premises of the General Fire Appliances Co., Limited, Johannesburg.

and also by the Railways and Government Departments.

The "Patrol" hand extinguisher is equally effective for use in stores, offices, and dwelling-houses. It is made with a solid copper cylinder, and always presents a good appearance. This machine is largely in evidence in the Transvaal, the Orange River Colony, and Natal.

Hydrant systems are erected by this firm on thoroughly practical lines, and the appliances to be seen in some of the principal buildings in Johannesburg—for instance, the Stock Exchange, Corner House, National Bank, General Mining Building, G. P. O., &c.—were supplied by this firm.

Messrs. GROCOTT and SHERRY.

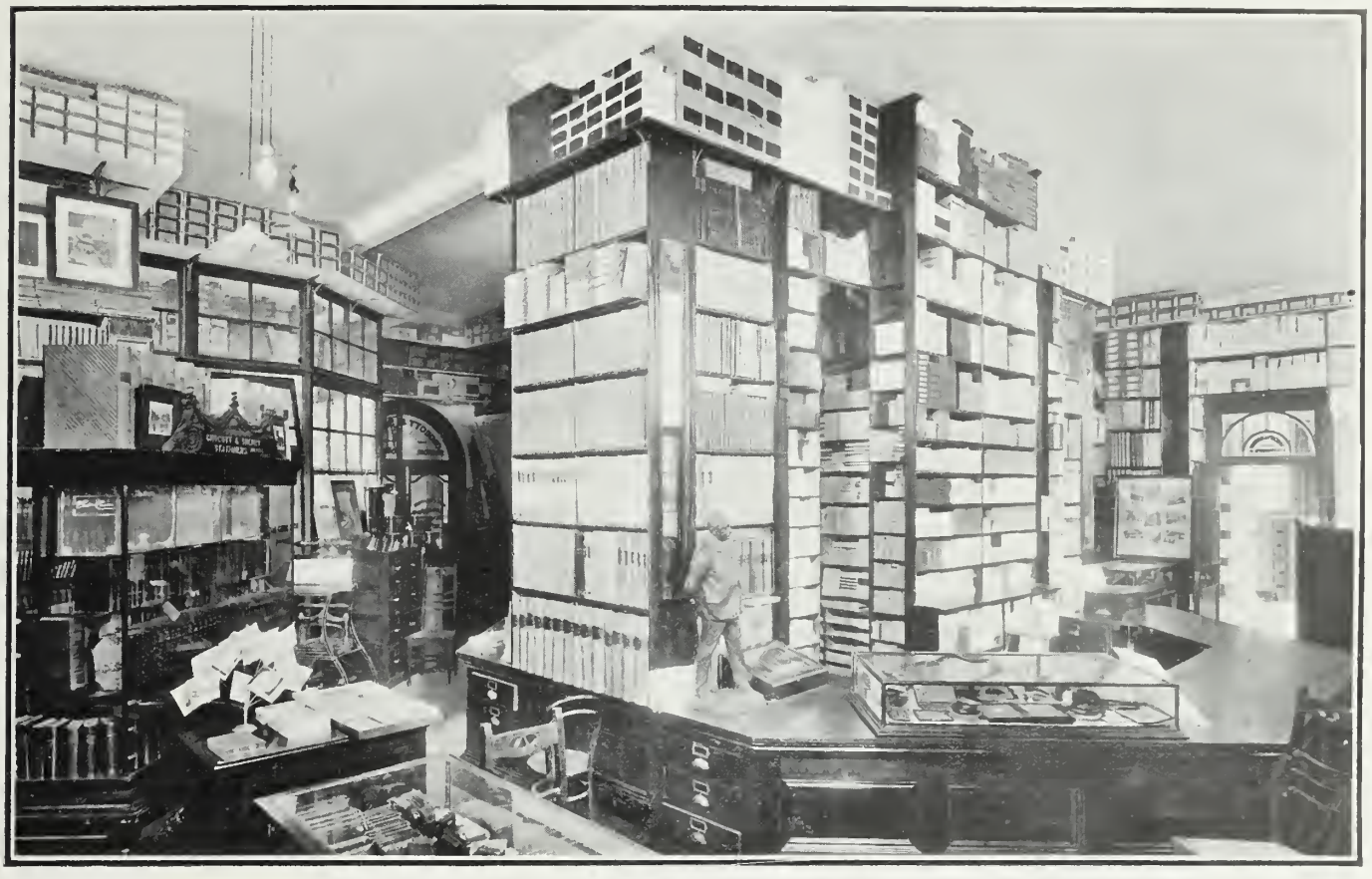
Possibly in no branch of commercial industry in South Africa has there been more rapid advancement during the last ten years than in the printing, stationery, and allied trades. It may further be safely asserted that in no individual house has that progress been more marked than with the old-established firm of Grocott and Sherry, printers, stationers, and booksellers, of Grahamstown, East London, Johannesburg, and London. Mr. Thomas Henry Grocott, who saw the light of day in 1840, arrived in South Africa at the age of 25, and joined the staff of the *Great Eastern*, an important newspaper in Grahamstown (the "Settlers' City"), Cape Colony. Very soon afterwards Mr. Grocott conceived the idea of starting the first penny paper in South Africa, and the well-known *Grocott's Penny Mail* was the result. From small beginnings against heavy odds, its proprietor, by sheer force of will and sound business methods, forged his way ahead. To-day he has the great satisfaction of looking upon the flourishing concern employing over seventy hands, of which he is the principal. Not only that, but personally Mr. Grocott has earned for himself the character of a man of integrity, and is highly respected and trusted by all with whom he comes in contact.

Assisted by his partners (Mr. Richard H. Sherry and his son Mr. William Ellington Grocott) the business controlled by the firm has become so well established that it occupies a foremost position in the country. Messrs. Grocott and Sherry's headquarters have remained in the town of its founder's adoption, Grahamstown, but the two branches in Johannesburg—at the "Corner House" and the "Castle Block," Eloff-street—together with the one at East London, are offsprings of which the parent firm may reasonably feel justly proud. The illustration of the interior of the Johannesburg premises here reproduced will show what can be accomplished in commerce when a start, however small it may be, is made upon the right lines. Praise is due to the firm's representatives in East London and in Johannesburg for the way they have steered their respective craft through good and bad times. There should be yet greater things in store for this firm with its energetic and loyal staff of assistants. Various commissions of honour have been entrusted to Messrs. Grocott and Sherry in their line of business, a recent one being the preparation of an illuminated address and magnificent album of South African photographs presented to Her Royal Highness Princess Christian, on the occasion of her visit to South Africa, in 1904. Messrs. Grocott and Sherry's newest premises at the Corner House, Johannesburg—possibly the finest commercial building in South Africa—are unique, and cannot fail to command

the admiration of visitors. On the ground floor a staff averaging seventeen assistants is busily engaged in the execution of orders for printing by

detail accuracy. With all the farms in the Transvaal shown, names in each instance are included, registered numbers given, and markings of new

rank by opening, in addition to his premises in Johannesburg, a sample showroom at Capetown, and by employing travellers to canvass the



INTERIOR OF JOHANNESBURG PREMISES OF MESSRS. GROCOTT & SHERRY.

means of electric motor power, stationery, bookbinding, and die-stamping. There is also a magnificent book department, replete with all new works of importance likely to command a sale in Johannesburg. A well-assorted circulating library of newest fiction is another feature of this flourishing branch. Messrs. Grocott and Sherry have been awarded six gold medals for the excellence of their productions in printing and rubber stamps at the principal South African exhibitions. Amongst the publications dealt with by Messrs. Grocott and Sherry may be mentioned "Troye's new Map of the Transvaal," as revised and extended by Capt. L. M. Boddam. This work has been executed by Messrs. Waterlow Bros., Ltd., of Johannesburg and London, one of the largest printing houses in the world. Its issue was announced for early in 1906. No pains have been spared to make this a unique and most useful production. In size some 9 ft. by 8 ft. a special effort has been made towards

boundaries, proclaimed "fields," mining right areas, holdings of land companies, etc. The usefulness of such a map, in which the geological features of the country are specially attended to, is obvious. Messrs. Grocott and Sherry announce a first edition of 500 copies, but the work should run into several further editions once it is distributed.

Mr. MAURICE HARRIS.

Mr. M. Harris, trading as M. Harris & Co., came out to South Africa in 1888, and immediately set to work to secure a share in the great commercial expansion which was then taking place. He established himself as a manufacturer's agent, with headquarters at Johannesburg, where he has resided ever since, participating in all the political and commercial vicissitudes of the Rand. Mr. Harris (whose postal address is Box 1215—cable address "Harriman") has now developed his business and brought it to the front

towns in all the Colonies, he is thus enabled to keep in close touch with the commercial pulse of the sub-continent. He endorses the opinion of most prominent commercial men when he states that 1905 was the worst year for trade that South Africa has gone through, and that at the beginning of 1906 merchants were still nervous about the future of the country, and therefore afraid to indent heavily for imports. Mr. Harris has held several important Government contracts, and during Mr. and Mrs. Chamberlain's overland trek in the Western Transvaal he was commissioned to provide the whole party—numbering 100 people, including a small battalion of press reporters with provisions, furniture, and tent accommodation at each halting place. The arduous nature of such an undertaking can only be realised by those who are familiar with veld life, but the arrangements made by Mr. Harris gave complete satisfaction, as testified to by the Lieutenant-Governor. Mr. Harris, besides

representing several leading English firms in various lines, has energetically developed the Austrian trade with South Africa. He represents some of their largest manufacturers, for whom he has introduced their excellent bentwood furniture, coloured prints, enamelware, and other merchandise into the South African market. The disabilities which are imposed upon those who patronise shipping companies outside the shipping ring are frequently felt by Mr. Harris, inasmuch as the geographical position of Trieste makes it almost obligatory for him to ship through the Austrian Lloyd Steamship Company, which is outside the ring, and some of the largest merchants here are therefore unable to order Austrian goods bought from him unless *viâ* Hamburg. Mr. Harris's Johannesburg showrooms near the corner of President and Von Brandis-streets are seen in the accompanying photographs. They exhibit a varied assortment of the highest class of goods. The firm's London office is at 44, Conduit-street, W. Optimism and prudent foresight characterise Mr. Harris in his business venture, and when the Transvaal has at last liberated itself from the weights and hindrances which have been be-

SHOWROOM OF MR. M. HARRIS, JOHANNESBURG.

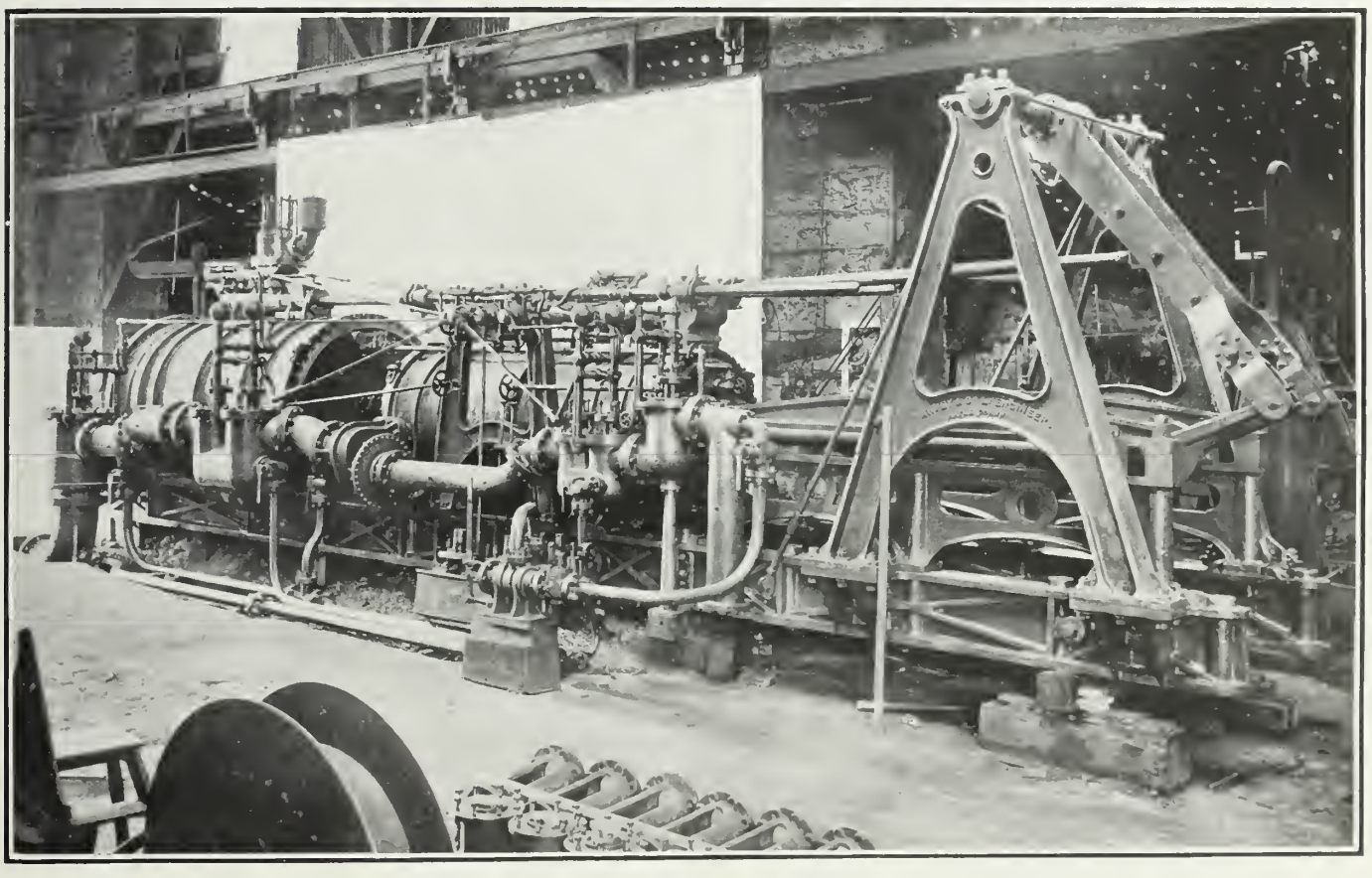
JOHANNESBURG OFFICES OF MESSRS. HARVEY & CO., LTD.

setting its commercial advance, there will be no one more prepared than he to "sail in on the flood" then; and he can be confidently recommended to manufacturers in all parts of the world who are content to let their goods rest on their merits, after they have been properly placed before the South African public. Mr. Harris enjoys a reputation of the highest integrity, and is looked upon by the community generally as a careful and capable business man.

HARVEY & COMPANY, LIMITED.

Cornish pumps and boilers are a familiar feature of every mining centre of the globe, from Cripple Creek to Klondyke or Kalgoorlie, and of course play an important part in the development of the Rand, where the well-known Cornish firm of Harvey & Company, Limited, has for many years past made it its business to cater for the supply of this class of plant. Prior to the year 1893 Harvey & Company were represented in Johannesburg by agents, but in August of that year it was decided to open a branch for the direct conduct of the rapidly-growing business in the Transvaal.

Out of the Cornish pumps in use on the Rand, up to the present time something like 75 per cent. have been supplied by Harvey & Company, a fact which speaks volumes for the favour with which the machinery of this firm is regarded by mine owners and managers. Their head place of manufacture is at Hayle, Cornwall, where they have been established for over a century. But Harvey & Company do not solely confine their attention to pumps; on the contrary, they are in a position to equip a mine of any size with the most complete plant, and to furnish estimates which would enable a mining company to ascertain at a glance what will be the entire cost of the plant most suitable to their particular requirements. One of our illustrations shows a fine common single-acting pumping engine recently supplied to the order of the Lancaster West G. M. Company, Limited.



Compound Single-Acting Pump Engine supplied to the Lancaster West G.M. Co. by Messrs. Harvey & Co., Ltd., Johannesburg.

Among the important sole agencies held by the firm are those for R. G. Ross & Son, of Glasgow, makers of Rigby steam hammers, and Gardiner & Sons, of Manchester, oil engines. In this latter connection it may be mentioned that Harvey & Company have supplied some of the largest oil engines on the Rand, and Messrs. Stuttaford's huge store is entirely lighted from two 45-H.P. high-speed oil engines of Messrs. Gardiner's make. The township of Bethlehem, Orange River Colony, is also now being lighted by means of one of their engines. Other agencies are those for Ward, Haggas & Smith's machine tools, of which a large stock is always held at Johannesburg; Multiple Fabri Co.'s belting; Croft & Perkins' split pulleys, of which articles Harvey & Company hold the largest stock in South Africa; Pearson & Knowles, of Warrington, makers of steel constructional work, cyanide tanks, &c.; Lee Howl & Co.'s pumps; Dewrance's steam boiler fittings, of which, in common with the manufactures of all the other firms represented, a large stock is always kept for the convenience of customers. Arrangements have also been made recently with the National Explosives Co., of Hayle, Cornwall, to represent them in South Africa.

The business is controlled from the central offices in Ægis Buildings, Loveday-street, Johannesburg, but there are large yards and stores at Marshall's Town, as shown in our illustrations, where a staff of draughtsmen and engineers is kept constantly employed. Another branch of the business is established at Bulawayo, and the firm has ample storage and sidings for the forwarding of goods at East London, Cape Colony.

Mr. H. J. HENOCHSBERG.

Since the occupation and annexation of the Transvaal by the British troops a very great amount of attention has been directed to securing an efficient and well-equipped Civil Service, and in this important matter the business of Mr. H. J. Henochsberg has played a useful part. Those sections of the Civil Service whose duty it is to wear the uniforms provided for them by the State are largely dependent on those who choose, design, and furnish those uniforms, not only for their personal comfort, but for smartness of appearance and pride in their branch of the service. No public servant likes to figure in shoddy, ill-fitting uniform, and the firm of clothing contractors whose business we now have under review has done much to prove that this point of view has met with the careful consideration it requires. The firm of Messrs. Hart & Henochsberg was started in Natal in 1880, and existed under the partnership for some 10 years. In 1887 Mr. Henry Henochsberg started a branch on Market Square, Johannesburg, where the Robinson Bank now stands, and he considers that that branch constituted a pioneer effort in the retail business on the Rand. This firm had long experience of outfitting contracts before obtaining those offered by the Transvaal administration. Its first contract was to supply uniforms for the Natal Government Railways, when that system only employed seventy men; and this contract is still held by the firm. It also has for many years supplied the uniforms for the Natal Police, the Fire Brigade, the Municipal Tramways officials, and the Customs, Harbour Board, and Post Office employés at Durban, where its headquarters are still established, in fine, spacious premises, where many of the orders are executed. The first tender for uniforms called for by the new Transvaal administration was for the General Post Office. Mr. Henochsberg's tender was the favoured one, and was accepted; but eventually the Government came to the opinion that there was no alternative but to place the order in the hands of the Crown Agents. This is a matter local merchants trust will receive early attention from the elected Legislative body shortly to be returned. The Central South African Railways, however, adopted another and more popular course, and the neat uniforms of their officials are supplied by Mr. Henochsberg's firm. This house furnishes also the clothing for the inmates of the Pretoria Lunatic Asylum, as well as the uniforms for the attendants. The first time the Johannesburg Fire Brigade called for tenders for uniforms this firm's offer was accepted; and the uniforms of other municipal officials, such as sanitary inspectors, &c., are also supplied by Henochsbergs, as are those of the Boksburg Health and Sanitary Board officials. Many of these orders are carried out in Natal, but larger orders have to be sent to England. The business is connected

H. J. HENOCHSBERG'S DURBAN PREMISES.

with a large firm in Liverpool which carries out big clothing contracts for the Liverpool Municipality. An important advantage which is secured by dealing with a local firm is that fit and necessary alterations can be guaranteed. In the case of orders delivered to home firms through the Crown Agents, all such have to be carried out subsequently by tailors, whose employment is a continual source of needless expenditure. Mr. Henochsberg takes full responsibility for fit, and carries out all alterations that may be necessary after the goods are delivered. But perhaps the greatest success achieved by this firm was the acceptance of its tender to supply uniforms to the Transvaal Cadets. These number 3,000 at present, and it is hoped that in the future the Cadet movement will become a national movement, embracing all towns in the Transvaal; therefore the order is one of great magnitude, and is receiving the most careful consideration. Part of the reason that this firm is so successful in its tenders is due, of course, to the excellent reputation it has built up in its long career, but a by no means inconsiderable factor is that it carries into effect the designs specified, having a special designing department at the head house in Durban. Henochsbergs were the only contractors who took the trouble to send in designs of the specifications in the case of the Cadet uniform, and the tasteful buttons and badges should have a very pleasing effect. Mr. Henry J. Henochsberg, the principal of the firm, makes his headquarters in Johannesburg, the Durban house being managed by his brother, Mr. D. N. Henochsberg. The illustration shows a handsome establishment which has been recently leased by the firm in Durban. This branch is to be fitted up in the latest style at considerable expense, and should be one of the most attractive stores of its kind at the Natal port.

Messrs. WM. HOSKEN & CO.

The business controlled by the above-named firm was established in the early days of Johannesburg, in 1889, and from the first was specially identified with mining supplies. As at present constituted, it furnishes practically everything required on a mine, other than the heaviest kinds of machinery. The principal of the business, Mr. Wm. Hosken, M.L.C., is also the local director of the British South African Explosives Company, Ltd., whose large works, employing some twelve hundred people, are situated at Modderfontein, about nine miles from Johannesburg. In addition to this general connection with mining supplies, Messrs. Wm. Hosken & Co. also represent Lloyd's (London), and the

MR. RICHARD HOSKEN, A.M.I.C.E., M.I.M.E.

Liverpool Underwriters' Association. In business agencies they are the representatives of Nobel's Explosives Company, Ltd., Glasgow; the "Climax" Rock Drills, of Cornwall; Samuel Osborn & Co., Sheffield; the Lilleshall Company, Ltd., Shropshire; G. MacLellan & Company, Ltd., Glasgow; the British Griffin Chilled Iron and Steel Company, Ltd., Barrow-in-Furness; Hepburn, Gale & Ross, Ltd., London; and other firms, chiefly representing British manufactures and insurance interests. The senior of the firm, Mr. Wm. Hosken, was for five years President of the Johannesburg Chamber of Commerce, and for two years held the office of President of the Associated Chambers of Commerce of South Africa. Mr. Hosken is a member of the Transvaal Legislative Council, of the Inter-Colonial Council for the Transvaal and Orange River Colonies, and of the Committee of Management administering the State railways in the two Colonies. He represented the Transvaal at the Customs Union Conference, Bloemfontein, in 1903, has been a Transvaal delegate to the various inter-colonial shipping freight Conferences that have been held in South Africa, and attended in the same capacity the recent Conference in London dealing with shipping freights. Messrs. Wm. Hosken & Co.'s business is conducted from their central offices on Government Square, Johannesburg. Their warehouses, which are extensive and complete, are situated in the City and Suburban township. They consist of three stores, each 250 ft. by 50 ft. in extent, carrying a most comprehensive stock, and especially requirements for mining. The firm is well known, active, enterprising, and extremely competitive in the conduct of its operations. In the main offices there is a staff of 20 employed; at the works some 40 natives under European supervision are engaged. Mr. Wm. Hosken, M.L.C., and a Member of the Inter-Colonial Council, is a native of Cornwall. He first arrived in the Transvaal in 1874, was afterwards for some years in Natal in connection with the well-known mercantile firm of Steel, Atkinson & Co. He returned to the Transvaal in the early part of 1889, settling permanently in Johannesburg. Mr. Richard Hosken, also a member of the firm, joined his brother in the business in 1897. He had previously been on the staff of the Great Western Railway, in charge of the Severn Tunnel works. He is an Associate of the Institute of Civil Engineers, and a Member of the Institute of Mechanical Engineers.

Yards of Messrs. Hunt, Leuchars and Hepburn, Ltd., Johannesburg.

Messrs. Hunt, Leuchars and Hepburn, Limited.

Natalians, like West of England people, are said to sleep with one eye open; but the popular impression on the Rand to-day is that when these fields were first discovered, either the residents of the Garden Colony had not been to sleep at all, or that if they had, then they kept both eyes open. Certain it is that some of the tit-bits of the Main Reef were acquired by Natal syndicates, while Natal business houses were amongst the first to recognise the trading possibilities of the future Eldorado. Amongst the latter must be mentioned the old-established firm of Messrs. Hunt, Leuchars and Hepburn, which in 1902 was converted into a limited liability company. The speciality of the firm is timber, and at the present moment, without the least exaggeration, it may be said they are the largest importers of timber in South Africa. The firm was founded in Durban in the early fifties by the late Mr. John Hunt, who was joined in 1869 by Mr. J. W. Leuchars, and in 1882 by Mr. A. Hepburn. In Durban the Company have very extensive yard accommodation, comprising some three acres of buildings, and four or five of open storage. The imports are chiefly received from the United Kingdom, Sweden and Norway; but Russia, Canada, the United States of America, Germany, Belgium, and Burmah are also drawn upon for supplies, which nowadays are largely brought by steamers in full cargoes. An important adjunct of the business is the local manufacture of joinery. In this department—conducted in a double-storied workshop covering an area of about 80 ft. by 130 ft., very fully equipped with the most modern wood-working machinery—are employed about 100 Europeans. Every description of window, door, casement, and special joinery is manufactured, and in addition there is an up-to-date turning plant. The Company are very large importers of galvanized corrugated iron, galvanized flat iron, cement, and every description of timber, including deal, pine, poplar, pitch-pine, teak, and hickory. Special attention is given to wood-and-iron buildings for up-country, which are pre-erected at the works, then taken down and afterwards packed for rail ready for re-erection. In Johannesburg the business of the Company is under the control of Mr. Alfred H. Nicholson, who is managing director for the Transvaal. The town offices of the Company are at Norwich Union Buildings, while the storage yards are at Denver township, midway between Johannesburg and Germiston. The firm was one of the first to migrate from Johannesburg proper to the suburbs, on finding the available space in the town becoming too cramped, and their example was speedily followed by other large business houses, until to-day the whole of the railway from Germiston to Johannesburg is flanked with the storage yards and warehouses of Rand firms. At Denver the yards, warehouses, and offices of the firm under notice cover something like nine acres; and it may be mentioned that this is the only private firm on the Rand which possesses its own railway siding. Hunt, Leuchars and Hepburn, Ltd., carry an enormous stock of timber for mining and building purposes, and in addition to the head office in Durban they have a branch in Delagoa Bay, in connection with which very big developments are pending. Mr. Alfred H. Nicholson, the managing director for the Transvaal, is one of the oldest residents of Johannesburg, having arrived there in February, 1887. He has always taken a very keen interest in commercial matters, and at the present time is a member of the committee of the Chamber of Trade. He is also a member of the Rand Pioneers' Association, in which he takes a great deal of interest.

Messrs. W. F. Johnstone & Co.

The first requirement of an embryo city is the material for building purposes, and until this want is supplied little or no progress can be made in the development of the town. So it was in the early days of Johannesburg. Amongst the first large firms of timber and builders' merchants to establish themselves on the Rand was that of Messrs. W. F. Johnstone & Co., a branch of the well-known Natal firm of the same name, whose extensive premises are situated in Brickhill Road, Durban. The timber yards of this firm cover an area of five acres, and are

TIMBER YARDS OF MESSRS. W. F. JOHNSTONE & CO., JOHANNESBURG.

stocked with timber from all parts of the world. Messrs. Johnstone & Co. have also erected extensive joinery works, fitted with the most modern plant, from which the Transvaal requirements are supplied. About 14 years ago Mr. W. F. Johnstone visited what was the nucleus of the city of Johannesburg to-day, and foresaw the promise of a huge industry, and, with commendable promptitude, he thereupon opened a branch office, which has ever since enjoyed an increasing prosperity, and has retained the confidence of its patrons notwithstanding continued and growing competition. In 1899 Mr. C. H. Leake took charge of the Johannesburg office, which is situated in Colonial Mutual Chambers, Fox-street; and since that date he has continued, without interruption, at the head of perhaps the largest business of its kind on the Rand—a business which makes a speciality of supplying every item required in the building line from tin tacks to the most elaborate joinery work that the trade can produce. Realising the advantages of the eastern "Fighting Port," Messrs. W. F. Johnstone & Co. carry large stocks of timber at Delagoa Bay. Their Johannesburg yards and sawmills are in Siemert Road, New Doornfontein, where extensive stocks—probably the largest of their kind in the Transvaal—are carried. Stocks are also carried at Germiston and at Boksburg.

Another View of the Yards of W. F. Johnstone & Co., Johannesburg.

Messrs. J. C. KIRKWOOD.

This firm was founded in 1887 by Mr. Richard Currie, who retired from business in 1902, after many years successful work in Johannesburg. Mr. John Chabaud Kirkwood, who purchased the business in 1902, is a Rand pioneer dating from 1887. He was born at Port Elizabeth, and inherits from his father that special aptitude which is essential for the successful auctioneer. In 1890 Mr. Kirkwood became a member of the Stock Exchange, and sat for ten years on the Committee of that institution, until he took over his present business. He was one of the earliest proprietary members of the Wanderers' Club, working on the Committee for a number of years in conjunction with such well-known men as Mr. Hermann Eckstein, Mr. Julius Jeppe, and Mr. Bailey. Mr. Kirkwood helped to raise and served with the South African Light Horse during the late war, holding the rank of captain, but being captured at Colenso his martial energy had to dissipate itself for five months within the barbed wire enclosure at Waterval. After the British occupation he was appointed one of the Commissioners of Johannesburg.

Mr. John Coulson Burchmore, who is also a member of the firm, was one of Mr. Currie's staff, having joined the business in 1895, but he has been a full partner since 1905. He was born in Manchester, and came out to South Africa in 1882. After seven years' residence in Natal he moved up to the Transvaal, where he engaged in business in Boksburg, until he joined Mr. Currie. Mr. Hedley Cullingworth, who is also a partner of the firm, is a native of Natal, and came to Johannesburg originally in 1889. He joined his present firm at the same time as Mr. Burchmore, and like him was admitted a partner in 1905. Mr. Cullingworth's special department is property, and his knowledge on this subject is unsurpassed. The ramifications of this business extend pretty well over the whole of South Africa, the firm making their chief feature real estate, live-stock, and furniture sales. In the latter branch they do by far the largest business in the Transvaal. In the former connection it is of considerable interest to note that the first valuation roll of Johannesburg and suburbs was compiled by this firm in 1901.

ARTHUR KOPPEL, LTD.

The firm of Arthur Koppel, Limited, of Howard Buildings, Johannesburg, was originally established in the year 1892, as a branch of the world-renowned firm of Mr. Arthur Koppel, of London, Berlin, Paris, and New York. The business grew with Johannesburg, and some five years after its establishment in that town had assumed such large proportions that it was decided to form it into a limited liability company as a separate undertaking. This was accordingly done, and the capital was fixed at £70,000, which is its present basis. When first started in Johannesburg the firm made a speciality of tramway and railway material. The scope of the business has now, however, been considerably enlarged, and the Company deals extensively in iron and steel constructions, modern conveying machinery, shoes and dies

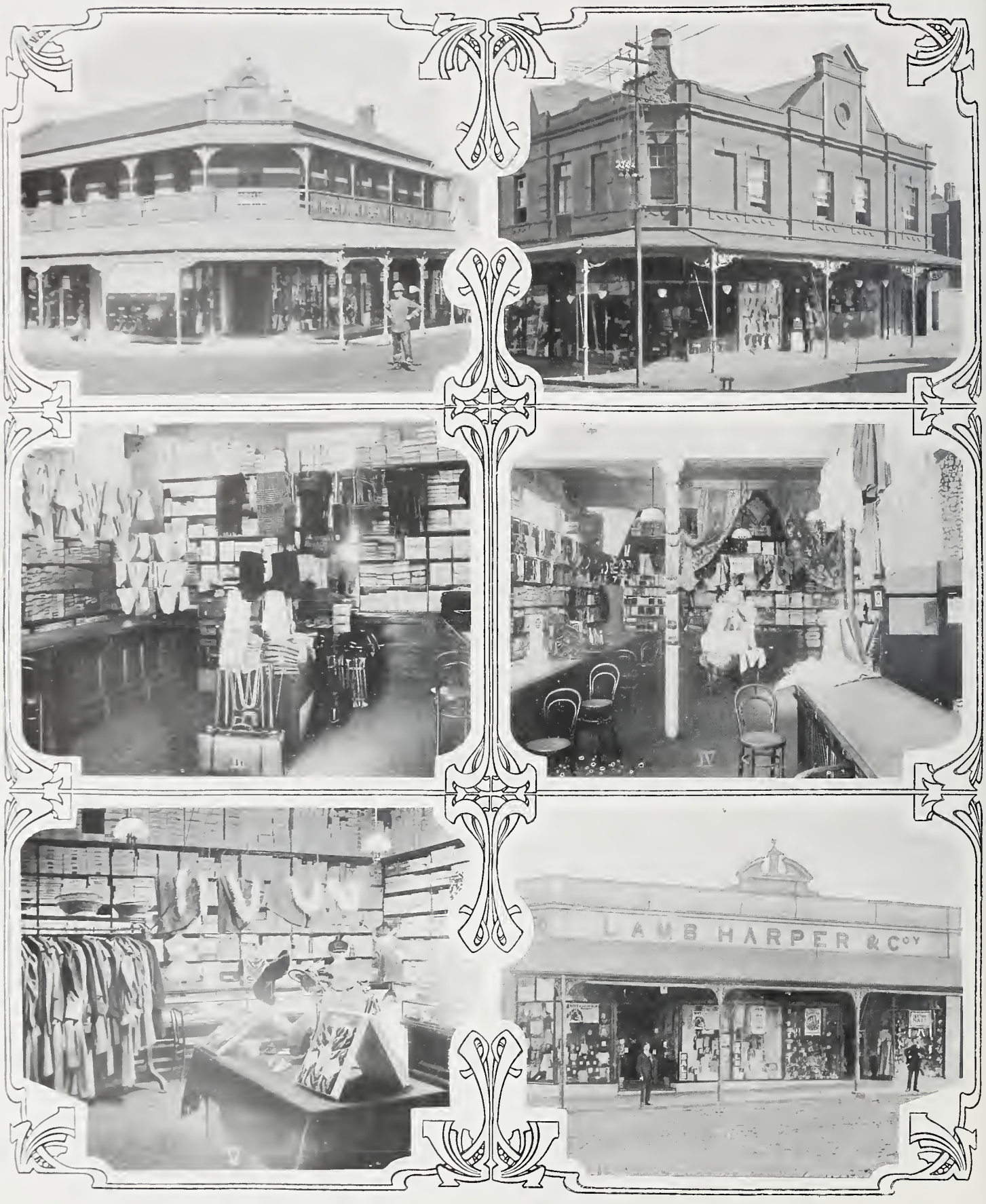
Yard of Arthur Koppel, Ltd., Doornfontein.
Cyanide plant at the Village Deep Mine, supplied by Arthur Koppel, Ltd.
Cyanide plant at the Wemmer Mine, supplied by Arthur Koppel, Ltd.
Offices, Main-street, Johannesburg.

for batteries, besides having the sole agencies for the well-known Temperley transporters, and for the Jeffrey Manufactnring Company of Columbus, Ohio, U.S.A. In South Africa the Company has branches in Capetown and Dnrban, as well as agencies in Bulawayo, Salisbnry, Bloemfontein, East London, Lonrenço Marqnes, Port Elizabeth, and Beira. Some of the most important work nndertaken by the firm in South Africa has been the installation of Temperley transporters at Delagoa Bay, Table Bay, and East London. The firm is now making a speciality of steel eonstruction work for building purposes, and has already snpplied the steel work nsed in several of the large buildings which have been erected since the war. For this and other purposes the Company keeps up a large engineering department under the supervision of a staff of competent engineers. The head office of the Company is in Johannesbnrg, Mr. A. F. Robinson and Mr. R. M. Flatow being the joint managing directors.

Messrs. LAMB, HARPER & CO.

The popnlous snburb of Jeppestown, lying a good stretch to the east of Central Johannesburg, is reached over a dusty, nninviting street interseeted with tramlines, and rising in a steep incline as it nears the snbnrb. The tram service is good, but the drive is nnpleasant and dull, and the bnsy Jeppestown folk would little appreeiate the questionable joy of going into the central part of the town for all their shopping. Large stores and business premises have therefore been established in this part of Johannesburg to supply a very great demand, and the shops in Jeppestown not only do extensive bnsiness but stock a very effective and nsefnl class of goods. Among those which provide for the wants of the better classes of the commnnity is the bnsiness of Messrs. Lamb, Harper & Co., whose drapery store, fonnded in 1887 on a smaller scale, has been greatly enlarged of late years. An extension of premises took place in 1899, when a boot and shoe department and a gentlemen's outfitting department were added. Another expansion will take place in the near future, when these departments will be moved to new premises on the opposite side of the street, the original building being devoted to ladies' outfitting and drapery, with a speeial department devoted to laees, gloves, ribbons, and such adjnncts to the general adornment of the fair sex. The firm carries a large and varied stock, running into heavy values, and always has on view a very attractive show of goods. They do all their own buying, and also act in a similar capacity for smaller provincial honses. The partner in eharge of this braneh of operations is Mr. Lamb, whose headquarters are in London. Mr. Harper, the other partner, has his residence in Johannesburg. The London buying office is at Nos. 5 and 6, Bridgewater-street, Barbican, E.C., and the Jeppestown address is at the eorner of the main thoroughfares, Marshall-street and Maddison-street. The bnsiness fonnded and organised by Messrs. Lamb, Harper & Co. is distinguished in one very important partienlar from many more pretentions firms on the Rand and elsewhere, it is entirely independent of any ontside control or financial support. It is neither tied nor financed by any bigger house, in South Africa or in the United Kingdom, and the bnsiness is conducted entirely on its own capital and resonrees. A smaller branch establishment has been started in Braamfontein, and is doing satisfactorily. For a town of the great extent of Johannesburg, with a scattered population, these suburban

KIRKWOOD'S AUCTION-ROOM, JOHANNESBURG. SALE IN PROGRESS.



1 and 2. LAMB, HARPER & CO., JEPPESTOWN, JOHANNESBURG.
3. Outfitting Department. 4. Drapery Department. 5. General Showroom.
6. Branch Premises, Braamfontein.

business premises are an immense convenience and advantage, and assist most materially in that development and improvement which all Johannesburgers so greatly desire.

Messrs. LIEBERG & CO.

There are many fertile districts in the Transvaal where crops of all descriptions flourish exceedingly, and in some of the warm moist zones, where almost tropical products can be raised, are extensive plantations of tobacco which supply a large portion of the "weed" smoked in South Africa. The tobacco industry is still in its infancy so far as the Transvaal is concerned, and very little is known or understood of the proper methods of cultivating a refined plant and producing a flavour and aroma that will compare favourably with American and European blends; yet "Boer" tobacco has a great popularity throughout South Africa (indeed, since the war, its fame has spread to Europe), and it is claimed that those who acquire the habit of smoking it will never care to use any other kind. Amongst the districts in which tobacco can be successfully grown are the Nylstroom (Waterberg), low-lying parts of the Eastern Transvaal, and the famous Magaliesberg range. In the sheltered recesses of these beautiful hills many farmers grow tobacco as their main crop, which is a source of profit not only to themselves, but to those enterprising firms who convey their produce to the best available market, and who put the raw and rather roughly-grown material into the most attractive and grateful form for the public. The firm of Messrs. Lieberg & Co. is one that has thus supplied the public taste, with considerable success, since 1893. Their material is entirely supplied by Magaliesberg farmers, some of whom are under contract to deal solely with them, although Messrs. Lieberg & Co. are open to other tenders at any time, and do not confine their dealings to exclusive contracts. The most important of the farms holding contract with the firm in question are those of Waterval, towards the Rustenberg district, and Boschhoek, both of which provide a large annual crop. The firm's factory, at 60, Main Road, Fordsburg (Johannesburg), deals with the raw material for purposes of sorting, treating by the various necessary processes, and classification. Upwards of 20 white employés are engaged, in addition to natives. There is also a cigarette factory in which a considerable number of women are employed, and it should be here stated that Messrs. Lieberg's were the first cigarettes to be locally manufactured from material grown in the country. In the other cigarette factories of the Transvaal Colony imported tobaccos are largely used, but Messrs. Lieberg & Co. use none but Transvaal tobacco. Mr. Aronstein, one of the partners in the business under review, manages the Johannesburg affairs. There are three branches in Johannesburg and one in Capetown. The business amalgamated some time ago with that of Mr. John Chapman, since which development there have been three partners—Mr. H. Lieberg, Mr. O. Seimer, and Mr. H. Aronstein. The firm does a large trade, both wholesale and retail, and has contributed largely in advancing this local industry from which so much is hoped in the future.

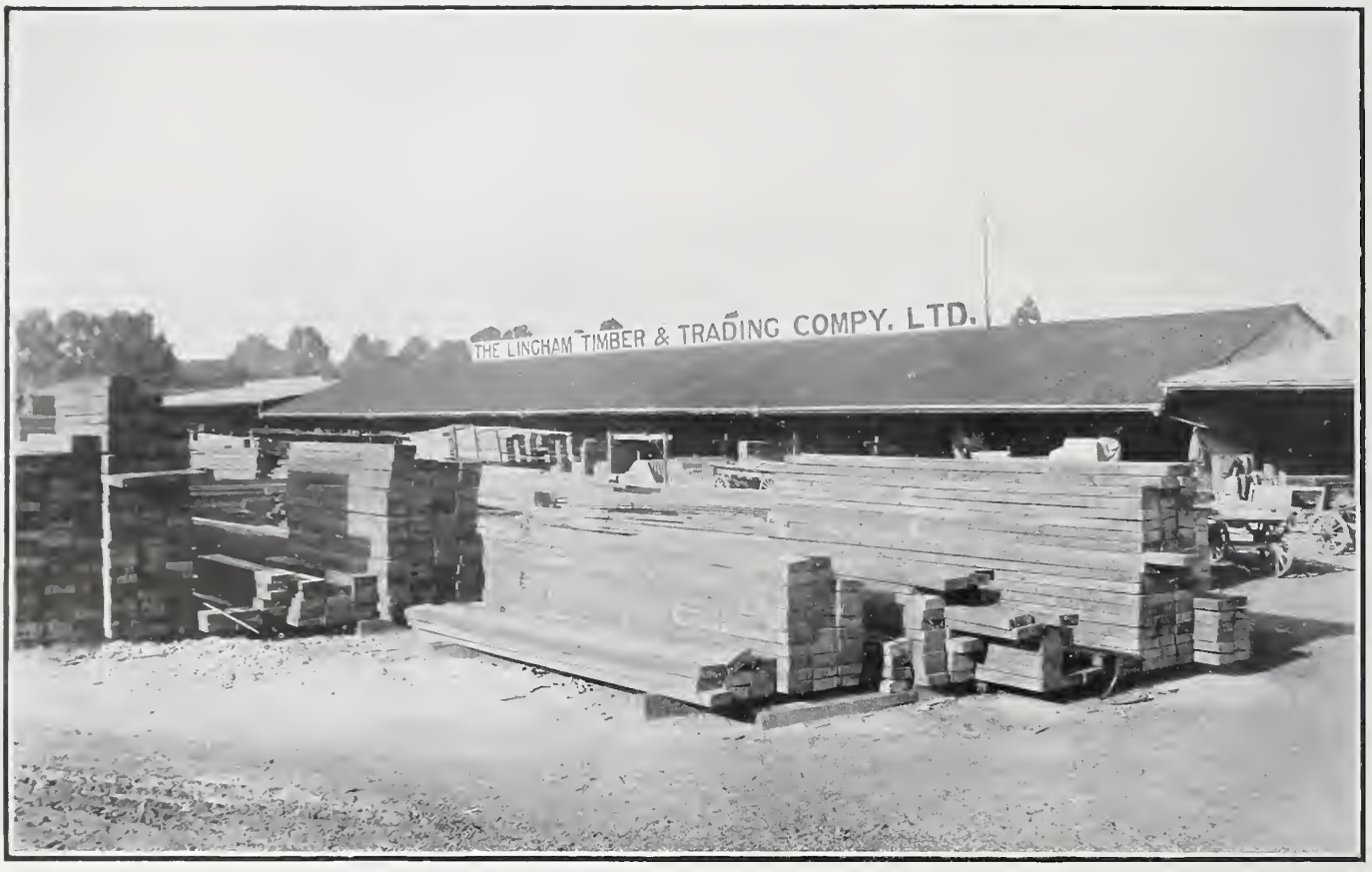
THE LINGHAM TIMBER AND TRADING COMPANY.

The Lingham Timber and Trading Co., Ltd., was established in 1893, by Mr. F. R. Lingham. On arriving in

JOHANNESBURG YARDS OF THE LINGHAM TIMBER AND TRADING CO., LTD.

(For further illustrations see Delagoa Bay section).

Johannesburg Mr. Lingham at once saw the immense possibilities of the timber trade, and set to work to develop it. He, at the very outset, met with an astonishing amount of success, mainly because he was one of the few who were able to meet the demand which sprang up in the boom times of 1894 and 1895, and the great expansion which followed those prosperous years. At the present time it is no exaggeration to say that the firm is the largest of its kind in South Africa. At Delagoa Bay the Company possesses what is practically a township, called "Port Matolla," which covers an area approaching some 500 acres. Here they have their own saw-mills, cold storage plant, workshops, warehouses, and offices. The place is some six miles from Lourenço Marques, and is connected with the Delagoa Bay railway by a private line belonging to the Company, and the Portuguese have their Custom House at "Port Matolla" for the clearance of all goods landed there. The business of the Company is by no means confined to timber. It does a large forwarding business, and is the largest importer of British cement to South Africa. They have special facilities for handling cattle, and in one year landed no less a number than fifteen thousand (15,000) head for the Transvaal Government. In supplying the mines with timber, the Company has carried out some very large contracts, as well as completing extensive orders for railway construction, and sleepers. It has large yards and offices both at Johannesburg and Pretoria, and employs a numerous staff of Europeans, as well as several hundred natives. Mr. F. R. Lingham has recently severed his connection with the Company, and the sole management in South Africa is now in the hands of Mr. H. A. Neame, who has been assistant manager since 1896.



JOHANNESBURG YARDS OF THE LINGHAM TIMBER AND TRADING CO., LTD.

Messrs. LOWENSTEIN, ADAMS & CO., LTD.

The value of the presence of highly-qualified chemists in the semi-tropics and in the warm latitudes of South Africa cannot be over-estimated, and residents in the Transvaal fully appreciate the professional services that have been rendered them for many years by Messrs. Lowenstein, Adams & Co., Ltd. This firm was originated in Johannesburg in 1885 under the style of Messrs. Lowenstein & Co., by Mr. S. Lowenstein and Mr. R. Dressel, both of these gentlemen being from Germany. In 1896 the concern was converted into a limited liability company, of which the present heads are Messrs. L. Lowenstein and A. E. Adams. The Company is among the most prominent wholesale and retail chemists' houses in South Africa. It imports direct, and in addition to the ordinary professional commodities inseparable from a modern chemist's establishment, specialities in mining chemicals and assay apparatus and requisites are stocked. The headquarters of the firm are situated in Market-street, Market Square, Johannesburg, in the near vicinity of the Post Office. They consist of a four-storey building with a 50 ft. frontage and 100 ft. depth. A commodious basement is utilised for the separate storage of rubber goods, liquids and solids, and the ground floor is partitioned into a handsomely-appointed retail shop, offices, and a wholesale showroom of exceptionally comprehensive equipment. The first and second floors of this building, which is the property of the Company, are let out in offices, and part of the third

floor is used by the firm for the storage of patent medicines and sundries. Mr. Alexander Macdonald is in charge of the retail department. Mr. Lowenstein and Mr. Adams personally supervise the wholesale branch. Messrs. Lowenstein, Adams & Co. have also a store in Marshall-street East, City and Suburban Township, where all reserve stocks are kept, the bulk of these being mining supplies. On this ground are also the Company's stables. It is interesting to note that this is the only firm that has specially brought a trained man from Europe for the adjustment, cleaning and repairing of the very fine balances and weights necessary on the Witwatersrand. It is the only firm in South Africa, also, which has sets of standardised weights for the checking of the minute weights so largely used on the mines. They carry the largest stocks in South Africa of mining chemicals and apparatus, and they have the valued reputation of being purveyors of only the best qualities. They are the sole agents of such noted European houses as the Berkefield Filters Company, the Pasteur Institute, and the Anti-Pneumonia Serum Institute. The firm, it may be added, has the honour of being specially appointed chemists to His Excellency Lord Selborne and family.

1. Interior of Lowenstein, Adams and Co.'s Retail Department.
2. Storeroom, showing fine scales and other apparatus used in Assay work.

Messrs. McArthur, Atkins & Co., Ltd.

The firm of McArthur, Atkins & Co., Ltd., came into existence in 1905, through an amalgamation of the interests of Messrs. W. & A. McArthur, Ltd., of London and Sydney, with those of Mr. Henry Atkins, of Capetown. The parent house, that of Messrs. W. & A. McArthur, an exceedingly well-known firm, is one of the largest exporting and importing companies in Australia. The business of Mr. Henry Atkins was a private trading concern in the Transvaal, founded in 1903, at a time when the most favourable opportunities presented themselves for ultimate expansion, and for introducing, without the unsound aid of a preferential tariff, a substantial increase in the inter-colonial trade of the British empire. The frozen meat and other produce imported into the Transvaal by this Company is almost without exception shipped from New South Wales, Queensland, and other Australasian Colonies. Messrs. McArthur, Atkins & Co., Ltd., trade under the style of the Standard Cold Storage Company, the head office of the Company being in London. Mr. W. A. McArthur, M.P., is Chairman of the Board of Directors. The South African business is under the control of Mr. Henry Atkins, managing director, and Mr. W. McArthur Mc Millan. Mr. Julius Herzfelder, who managed the business of Mr. Henry Atkins from its inception, remains manager of the Company's operations in the Transvaal. The Standard Cold Storage Company conducts an essentially wholesale business, on a most extensive scale. Simultaneously with its formation as a joint-stock company, cold storage premises were acquired in Capetown, Port Elizabeth, and Durban, in addition to those existing in Johannesburg. The storage capacity at Capetown is 80,000 cubic feet, at Durban 60,000, at Port Elizabeth 40,000, and at Johannesburg 50,000 cubic feet. About 1,000 tons of frozen produce are imported per month, the vessels employed in carrying this freight being those of the Tyser line. Supplies for the Transvaal are mostly landed at Durban. Butchers, mine

compounds, and other consumers in bulk, are supplied by the Standard Cold Storage Company. The head office for Johannesburg is situated in Fordsburg, and there is a branch office in Fraser-street, "between the chains." The capital employed is £400,000. This business undoubtedly constitutes a vital factor in the commercial fabric of the Witwatersrand. The Standard Cold Storage Company also deserves well of the public, inasmuch as it has established in connection with its operations two important industries. One of these is a bacon-curing business. Pigs are purchased locally, and with the advance of agricultural development in the Colony this industry will undoubtedly assume extensive proportions. Another industry in which Messrs. McArthur, Atkins & Co. are interested is the production of ice. The Company owns one of the largest ice-manufacturing plants in Africa, and employs a large number of hands, both European and native. They also own and maintain a fleet of fishing smacks at Port Elizabeth, the fishing being done with line, not by trawling.

PANORAMIC VIEW OF THE STANDARD COLD STORAGE COMPANY'S WORKS, FORDSBURG.

MARIST BROS.' SCHOOL.

This school was opened in 1889, when it started with 21 pupils. Within four years the number had increased to 350, and in 1898 rose to 700. The school was open during the war, but in that troublous period the number of pupils fell to 80. After peace was declared the roll of scholars again gradually increased to the present number of 500. The school building is now being considerably added to, and when complete will be one of the finest in the Transvaal. In 1895 the gymnasium was built. It measures 80 ft. by 30 ft., is fitted up with the most modern appliances, and is the finest in South Africa. Gymnastics form part of the curriculum of the school, and the consequent improvement in the boys' physique and general discipline has been most marked. The annual gymnastic displays have been pronounced, by those capable of judging, to be the best of the kind in South Africa. Mr. B. Vieyra, the gymnastic instructor, has won golden opinions on all hands for his very successful physical training of the lads.

The boys are prepared for the Cape and English Universities and the College of Preceptors examinations. A large number of former pupils have passed with distinction through the Universities and have attained high positions in the learned professions. Within the last two years close upon two hundred boys from the school have passed the College of Preceptors examinations, the preparation for which has always been specialised with the greatest success. During the period from 1892 till the beginning of the war, 350 University certificates were obtained by the pupils.

It should be mentioned that while the Brothers are a Roman Catholic body, the institution is an entirely undenominational one, three hundred and fifty boys out of the five hundred being non-Catholics. The Brothers, after long experience with boys, have ascertained that the opponent system which is in vogue in their establishment produces the most satisfactory results from the pupils. Briefly the system is this:—Each of the junior standards is divided into half, and each boy is given an "opponent" in the other half. At the end of the month those boys who have attained more marks than their opponents are granted a half holiday, and it is safe to say that the zeal put into their work by the youngsters under this system is better than under any other that has been introduced.

Studies are not allowed to give place to sport. Not a minute of the school hours is sacrificed to it. The great success of the school in the sporting world is due to the keen interest taken by the teachers in the games of their young charges. The Marist Bros. have retained all the sporting shields, for competition amongst similar institutions in the Transvaal, for the last two years. Some of the records attained at their sports compare favourably with those made in the English public schools. The institution also boasts of having a fine Cadet Corps, which is under the Government. The first Cadet Corps in this Colony was formed at the Marist Brothers' establishment some years previous to the war. Owing to it not being a Government institution the corps had to be disbanded, but with the advent of the British it was restarted, and is now in a flourishing condition.

The school possesses a fine brass band under the conductorship of Mr.

Butter Department, Standard Cold Storage Company's Works, Fordsburg.

James Hyde, a prominent Johannesburg musician.

In the fine laboratory which the Marist Brothers possess, both physical and practical chemistry are taught; while the latest addition to the curriculum is woodwork, which is under the guidance of a qualified instructor.

The establishment has a staff of twenty-four teachers, and education is carried out on much the same lines as in the public schools in England. As several boys come from a distance, stabling both for horse and cycle is provided. Luncheon can also be obtained on the premises. The school charges are very moderate, and those desirous of giving their sons a sound education combined with a good physical training could not do better than send them to this excellent institution.

MARSHALL'S TOWNSHIP.

In the early days of the Witwatersrand gold fields a portion of the farm "Turffontein" was acquired by Mr. H. B. Marshall, who in 1886 obtained permission from the Government of the South African Republic to lay it out as a township. This property forms part of the original town of Johannesburg, lying along the reef from the City and Suburban Township on the east to Ferreira's Township on the west. The northern boundary is Commissioner-street, the chief business thoroughfare of the "Golden City," and the southern limit is formed by the mining areas situated on that portion of the reef. The property was laid out in stands, a ninety-nine years' lease being disposed of subject to a monthly "stand licence" or payment of 10s. per stand. There are 902 stands included in the township, with leases dating from January, 1887, in addition to certain freehold lots, upon which have been erected some fine business premises and buildings. At a later period Mr. Marshall formed a syndicate to acquire this property under the title of "The Marshall's Township Syndicate, Ltd.," with a capital of £50,000, in 10,000 fully-paid shares of £5 each. Within the limits of Marshall's Township are Government Square (containing the old Government Buildings, now used as headquarters of the Transvaal Town Police Force, and also for the magistrates' courts) and Marshall Square, which contains the fine block known when first completed, just at the commencement of the war, as Krause's Buildings, and used as a police station and quarters. In close proximity, fronting the Square, stands the new Stock Exchange.

"NELSONIA."

Away south from Johannesburg, in the suburb of West Turffontein, lies the estate known as "Nelsonia." In the days before the war it was called the Booysen's Nurseries, Booysen's being then the nearest suburb. Since the conclusion of peace, and the expansion of almost every business on the Rand, the growth of Johannesburg's suburbs has only been equalled by the

Curing Department, Standard Cold Storage Company's Works, Fordsburg.

growth of the Booysen's Nurseries. The estate now embraces 450 acres of cultivated land, and it may be a matter of surprise to many people to learn that within this area there are no fewer than thirty million plants and trees in stock, and that this huge number has been on hand to order any time in the last twelve years. "Nelsonia" appears to be situated in an ideal spot for nursery gardening and experiments in horticulture, and this is what its owner claims for it. Thirteen or fourteen years ago the aspect of this part of the Rand was not promising, and few would have believed then that the veld could be made to blossom into such luxuriance. Well-sheltered and well-watered, its powers of productiveness seem fairly

hitherto unknown, discovered by Mr. Nelson in his wanderings through Africa, and named after him according to the graceful and time-honoured custom of explorers and collectors the world over. Slips of these specimens realise astonishing prices, and are in great request among members of the horticultural profession, as much as £50 having been offered for one. Scientists of European reputation know of "Nelsonia," and correspond with the enterprising founder, and his counsel has been sought by members of the Agricultural Departments in this country in regard to knotty questions which only long experience can pronounce upon, and in matters relating to the welfare of new settlers and the Land Settlement schemes. In laying

nesburg journalism. Mr. Nelson has an enthusiastic belief in the possibilities of the country in regard to forestry and fruit-growing. For the latter he considers the conditions are exceptionally excellent, and his beautiful nurseries can produce many marvellous instances of growth and culture in proof. He is also a strenuous advocate of the cultivation of the British oak, claiming for it that it attains as fine a growth in the Transvaal in ten years as in 50 years in the British Isles, and that the wood is as lasting and as ornamental as the European product. Mr. Nelson made his first trip to South Africa in 1876, and after spending a year on the Kimberley diamond fields he started on an exploring and botanising expedition in the then little-

DURBAN BRANCH OF THE STANDARD COLD STORAGE CO.

inexhaustible, and plants, trees, and fruits from all parts of the world—from tropical climes to the frozen North, from the Rocky mountains to Japan—are to be found within the domains of "Nelsonia," all apparently flourishing and coming to perfection. A visit to the nurseries is as pleasant a business trip as can well be conceived, and in addition is a liberal education in itself. All manner of rare and costly plants may be seen, under glass and growing in the open; fruit-trees of every imaginable variety, laden with fruit, grow by the acre; and forest trees and ornamental shrubs stretch in long avenues. Besides these, there may also be seen specimens of plants,

out the township of Kensington, the Kensington Estate Company invoked the aid of "Nelsonia," and sixty-six miles of streets and avenues, now planted closely with flourishing young trees, all supplied from its nurseries, will be a lasting monument to the skill and industry that carried out this difficult and laborious undertaking. In the years to come, the many varieties of foliage which will adorn this newly-created suburb will be one of the most valued assets of the municipality. For this feat Mr. Nelson received the *Critic* Cake—a playful acknowledgment of anything extraordinary or absurd which is a recognised feature of Capetown and Johan-

known territories of the Boer Republics. The trip extended into what is now known as Rhodesia, and the interesting collection of rare botanical treasures then collected was accepted with joy by the authorities of Kew Gardens, and Mr. Nelson received the thanks of Her late Majesty's Commissioners. On his return to Africa, he planned and laid out the plantations at "Prinsberg," Mr. Newberry's fine property in the Orange River Colony, which is now one of the show places in South Africa. He then settled in the Transvaal, and "Nelsonia" came into existence. Mr. Nelson is the son of a well-known nurseryman of the good town of Sheffield, and is ardently attached to

the profession of which he is so competent an exponent.

Messrs. E. NETTMAN & CO.

The firm of E. Nettman & Co. is well known on the Rand, and does an extensive business, hardware and household utensils of all descriptions being stocked. An important part of the operations of this firm, and one that gives it a place in the front ranks, is that many of the articles stocked are manufactured on the firm's premises: and, though a great import trade is done also, it is a subject for congratulation that an industry of this description should be inaugurated in the town. Large quantities of metal work and utensils of all sorts are turned out at the firm's factories. Messrs. E. Nettman & Co. have been established in the Transvaal since 1885. Prior to this the firm had an establishment at Barberton, where a large business was done in the importation of mining materials. It was the first firm to import the Otto aërial rope-ways, and in many directions took an active part in mining enterprise. The Worcester Gold Exploration Mine was one of Mr. Nettman's first ventures, and was favourably known as "The Independent." The firm still imports mining materials, but not on so large a scale, attention being confined principally to hardware, both imported and of local manufacture. Mr. Nettman, the head of the firm, arrived in the Transvaal in 1884, but it was not until 1892 that he removed his business to the Rand, where it gradually assumed its present size and importance.

THE NEW TRANSVAAL CHEMICAL COMPANY, LIMITED.

What may be termed a pioneer of manufacturing industries in the Transvaal is the New Transvaal Chemical Company, Ltd., which carries on a manifold industry of great importance to the development of the Colony. While the head office is in Glasgow, the works in South Africa are at Halfway station, near Germiston, on the Johannesburg-Springs railway. When the Company was formed in 1892 its only manufacture was that of sulphuric acid. At that time it was expected that a large quantity of this would be required for the treatment of gold-bearing pyritic concentrates by the chlorination process of gold extraction. Through the subsequent discovery of the cyanide process, the chlorination treatment lost ground, and thus the Company suffered a serious reverse. In 1896, however, it was re-constructed, and then added to its operations that of metallurgical custom works for the treatment of concentrates and gold-bearing bye-products. Other manufacturing branches were also started, which made successful progress until 1899, when the outbreak of the war temporarily checked the development of the business. Since the conclusion of hostilities it has added several new branches of manufacturing, and has made rapid strides. Its present position is very sound, both financially and commercially. Besides sulphuric acid and nitric acid, artificial manures, disinfectants, and some special paints are made, and they have lately started manufacturing candles on a large scale. The metallurgical works of the Company are also at present the most important in the Transvaal, and one interesting feature of their operations is that the sulphur contained in some gold-bearing pyrites is utilised for the manufacture of sulphuric acid before the gold is extracted. Yet another department is the bottling and marketing of the natural mineral water from springs situated in the Transvaal. This has now become a favourite table water in the country. Proof has thus been given that a good many articles can be successfully produced in the Transvaal, while up to quite recently the country was entirely dependent on imported goods. The Company has therefore paved the way for the establishment of manufacturing industries which will greatly contribute to the development of the Colony. Such enterprising efforts should prevent money from going out of the country, and should give means of existence to many skilled workmen.

Unloading Carcases for the Standard Cold Storage Co. at Durban.

Good dividends for several years have been paid, that for 1904 being 25 per cent., and the prospects for the future under the present able management are very good indeed. The success of the New Transvaal Chemical Company is to a great extent due to the managing director, Dr. J. Schlesinger, the originator, who has been closely identified with it since 1896. He may be undoubtedly considered the pioneer of Transvaal manufacturing industries, and has in spite of the greatest difficulties and reverses brought the Company to its present prosperous position. Prejudice has in the past greatly handicapped local manufacturers accelerated by the powerful opposition of those interested in the importation of home and foreign goods. At present about 30 British workmen and officials, and nearly 200 Kafirs, are employed. The works, together with quarters for employés, offices, laboratories, etc., occupy an area of nearly 30 acres, including 12 valuable gold-mining claims which adjoin the Witwatersrand Gold Mining Company's property. A special railway siding, extending along the whole of the ground, offers splendid facilities for the transport of coal, minerals, raw materials, and

General view, showing Chlorination Works on extreme right.

View of the Acid Works.

WORKS OF THE NEW TRANSVAAL CHEMICAL COMPANY, LIMITED.

Railway Siding and Chlorination Works.

Laboratory and Workshops on the West Rand Line.

manufactured goods. The addition of one or two other important branches are at present under the consideration of the Board. Our illustrations will convey a good idea of the magnitude of the operations of the Chemical Company, and the space its works cover.

THE OCEAN ACCIDENT AND GUARANTEE CORPORATION, LIMITED.

The Ocean Accident and Guarantee Corporation, Limited, with an authorised capital of £1,000,000, is a company whose various forms of insurance are known throughout the whole civilised world. Their operations commenced in the year 1871, when the "Ocean Railway and General Travellers' Assurance Company, Limited," issued its prospectus to the general public, and in the following year commenced the business which has now developed into the largest and most successful British Accident Insurance Company. For that year its premium income amounted to £2,481 5s. 2d. The name of the Company was changed in 1875 to the "Ocean Railway and General Accident Company, Limited," and in 1876 the transaction of guarantee business was started by a sister company. In 1891 the two companies respectively transacting, under the same title, Accident and Guarantee policies, became amalgamated under the sanction of a Special Act of Parliament. Other amalgamations followed, "The Imperial Union Accident," the "General Accident Guarantee and Indemnity Company" of Dublin, the "Security Company," and the "Employers' Indemnity Company," having successively joined forces with the "Ocean." When the Employers' Liability Act came into force in 1881, a bold bid was made for a portion of the insurance naturally arising therefrom, and a satisfactory share came into the hands of this Corporation. On the passing of the Workmen's Compensation Act in 1897, which so largely increased the liability of employers, the "Ocean" struck out an independent line and put forward rates which appeared fair, so far as its experience went. The Company's enterprise in this direction was amply rewarded, and the business thus secured, coupled with the large expansion of other departments, gave the Corporation an income for that year of no less an amount than £717,924. Subsequent expansion has been phenomenal. Three years later, in 1901, for the first time in the history of insurance,

E. Nettmann & Co.'s business Premises, Johannesburg.

an accident company issued a balance sheet showing a premium income exceeding £1,000,000, and that Company was the "Ocean," whose income for the year amounted to no less a sum than £1,090,502. In 1902 progress was again manifest, the revenue reaching the truly gigantic total of £1,196,654. In 1903 the premium income amounted to £1,101,182. In 1904 the amount was £1,090,527 8s. 3d., which is a larger income than that of any other company transacting the same class of insurance. Eight years ago those figures were represented merely by a sum of £324,375—three to four times less than the present figures.

All classes of accident and contingency business are transacted by this Corporation, such as personal accidents, accident and disease insurance, em-

Interior of E. Nettmann & Co.'s Works, Johannesburg.

ployers' liability, workmen's insurance, boiler insurance, lift insurance, burglary insurance, fidelity guarantee bonds, &c.

The "Ocean" has been represented in South Africa for some years by agencies, but in the year 1902 the Corporation decided to open its own branch office in Capetown, under the management of Mr. R. Y. Sketch, a gentleman of wide experience from one of the English offices. Following on the visit of the General Manager in 1905, branches were also established at Durban and Johannesburg. In the latter town their offices are in the Ægis Buildings, Loveday-street, where Mr. H. J. Kebble is in charge. The London offices are at 36 to 44, Moorgate-street, E.C., and their ramifications penetrate to every corner of the globe.

The keynote of the Corporation is expressed in the words safety and fairness, and since it was founded in 1871 it has paid £4,500,000 in claims. At the present moment its invested and other funds reach the colossal sum of £1,337,989, being considerably more than twice the amount of the paid-up capital of the Corporation.

THE PALACE STUDIOS.

The art of photography was never more popular than it is to-day, and it is safe to say that it will be long ere the public, in the United Kingdom and in other parts of the world, weary of seeing re-productions of life as it exists in Johannesburg. Of the various photographic studios from which illustrations for this work have been furnished, that of Mr. Thos. O'Byrne, of the Palace studios, situated at the junction of Pritchard-street and Rissik-street, may be specially mentioned. This suite of studios is luxuriantly furnished, and the specimens displayed on walls and easels give abundant evidence of the extremely high-class work executed by Mr. O'Byrne. He is recognised as one of the leading photographic artists in Johannesburg, and has received sittings from amongst the most prominent residents and visitors. His landscape and outdoor work generally is fully equal to the studio's results, a very large amount of work of this description having been carried out in connection with the illustrations contained in this work. This business has been established in Johannesburg, in its present premises, for eight years. It has a constantly increasing *clientèle*.

MESSRS. A. PARGITER AND CO.

Messrs. A. Pargiter and Co., importers of mining materials, iron, steel and metal merchants, have their office in New Club Buildings, with extensive stores in the City and Suburban township. Although not an old-established firm, having come into existence since the war, it has already made great progress, and to-day, in the particular lines in which it trades, it is recognised as holding a leading position in Johannesburg. One of the principal firms Messrs. Pargiter represents is that of Messrs. T. Cooke and Sons, Ltd., London, the manufacturers of theodolites and all kinds of levelling and surveying apparatus. They also represent the Lunkenheimer

OFFICES OF A. PARGITER AND CO., JOHANNESBURG.

Company of Cincinnati, Ohio, makers of re-grinding valves, which are extensively used in the United States Navy. This firm also manufactures brass and iron valves, injectors, whistles, lubricators, oil and grease cups, and other steam appliances which are largely requisitioned on the Rand. Messrs. Pargiter and Co., in addition, include in their business that of diamond merchants, and they hold one of the largest stocks in South Africa of Brazilian carbons and borts, as well as Kimberley borts. In view of the amount of diamond drilling that is now proceeding on the Rand, the firm has made special arrangements for receiving continuous supplies of these articles so as to be always in a position to supply any demand that may arise. Mr. Pargiter has been connected with business on the Rand since the early days of 1889. He is now one of the most prominent commercial men in Johannesburg, and takes a great interest in all matters affecting the commercial and industrial development of the Transvaal.

MESSRS. PARKER, WOOD AND CO., LTD.

Amongst the many important Johannesburg houses which in various ways lay themselves out to cater specially for the requirements of the mining industry, upon which the prosperity of the town itself depends, must be mentioned the old-established firm of Messrs. Parker, Wood and Company, Limited. Originally established in Natal nearly half a century ago, under the style of Parker, Wood and Co., this firm was transformed in the year 1890 into a private limited liability company with its present well-known title. With the two exceptions of machinery and explosives, almost every description of goods required by the mines of the Rand is dealt in by the firm at its Johannesburg branch. There are of course other branches of Parker, Wood and Company, Ltd., at most centres of

population throughout the Transvaal and Orange River Colony, but these are controlled from Natal, and are established for the purpose of meeting the ordinary requirements of the pastoral and agricultural community. It is the intention of the Company to extend its business in Johannesburg by catering for the retail ironmongery and household trade—and for this purpose a four-storey brick building is shortly to be erected immediately adjoining the existing premises. The new building will be constructed on the most up-to-date lines, and furnished with goods and passenger lifts and other conveniences for conducting a retail business in the most efficient manner. Mr. W. A. Martin, who has had a long and almost unrivalled experience of the Johannesburg trade, dating back from the year 1887, is the resident managing director of the Company, the local business of which is under the immediate management of Mr. G. S. Kempis, who has been associated with the firm for nearly twenty years. Mr. Martin, in addition to the duties of his position, takes a personal interest in the development of the auriferous resources of the Rand, and is chairman of the local Directorate of the Durban-Roodepoort Gold Mining Company, and the Vogelsstruis Estate and Gold Mines.

PREMISES OF PARKER, WOOD AND CO., LTD., JOHANNESBURG.

THE REMINGTON TYPEWRITER AGENCY.

The agency in Johannesburg for the world-renowned Remington writing machine was established in 1896, and is now located in spacious premises at the Rand Club Buildings, Commissioner-street. The advantages of the Remington machine are of such world-wide repute that it would appear almost fulsome to extol its many excellent qualities. Suffice it to say that it is in greater demand to-day in the Transvaal than that of any other make, thus deservingly occupying its right position. The machine is used largely in the Government and the Central South African Railway offices, and scarcely any business establishment of any repute in the town of Johannesburg, or for the matter of that any of the principal country towns, will be found without its "Remington." The Remington Typewriter Agency are sole representatives also for the best makes of office requisites in the shape of duplicators, filing cabinets, card index cabinets, and "Gunn" roll and flat-topped desks, stocks of which are locally carried. Large and complete stocks of typing accessories of all descriptions, notebooks and necessaries for reporters and pressmen, copying books and other articles required in a business office, are kept on the premises. The business of the agency is under capable management.

Interior of Premises of the Remington Typewriter Agency, Johannesburg.

MESSRS. ROBINSON & FOY.

The firm of Robinson & Foy, cigar and cigarette merchants, of 45, Green's Buildings, Johannesburg, was originally started by Mr. Robinson at Raine's Buildings in January, 1903. It extended so much that in the following year Mr. Robinson took Mr. H. T. Foy into partnership. They are agents in the Transvaal for Messrs. Bucktrout and Co., of Guernsey, cigar and cigarette manufacturers, and Messrs. A. G. Coussis and Co., Egyptian cigarette manufacturers, of Cairo and Malta. The business is both wholesale and retail. Amongst others, they supply the following: Transvaal Civil Service, the Johannesburg banks, Johannesburg Municipality, Athenæum Club, Wanderers' Club, Catholic Club, Transvaal Volunteer Canteen, Rand Water Board, and the Chamber of Mines. They also supply a good many of the officers' messes. In the middle of 1905 it was found necessary, in order to cope with ever-increasing business, to appoint sub-agents in the persons of Mr. Clavell Blount and Mr. Aran. The firm makes a speciality of the way in which they import their goods. Owing to the dry climate of the Transvaal it is impossible to keep large stocks of cigars and cigarettes here; that is, if they are to retain their quality. To obviate this, they import their stock monthly, so that there is always a stream of fresh goods arriving. As Mr. Robinson puts it, their storehouses are as much on the high seas as on land. This costs them more, but their idea is that it is more satisfactory to supply goods in thoroughly first-class condition than to make the additional profit that accrues by keeping large stocks on hand.

The senior partner, it may be mentioned, is a retired Major, having 14 years' service to his credit. He was in the Royal Irish Rifles, and was on active service for seven years, including service in the Boer war. He is the holder of four medals and nine clasps.

SANDERSON'S SADDLERY.

Among the many fine buildings that have been erected on the Market Square, Johannesburg, in recent years for business purposes, none occupy a more prominent position, or have a more imposing appearance, than the headquarter premises of Mr. J. Sanderson, the premier saddler, harness manufacturer, and carriage builder and importer. Like many another house, the establishment under notice was founded with small beginnings years ago in the Cape Colony, but Mr. Sanderson was one of the first to realise the possibilities of the Witwatersrand, and his foresight has met

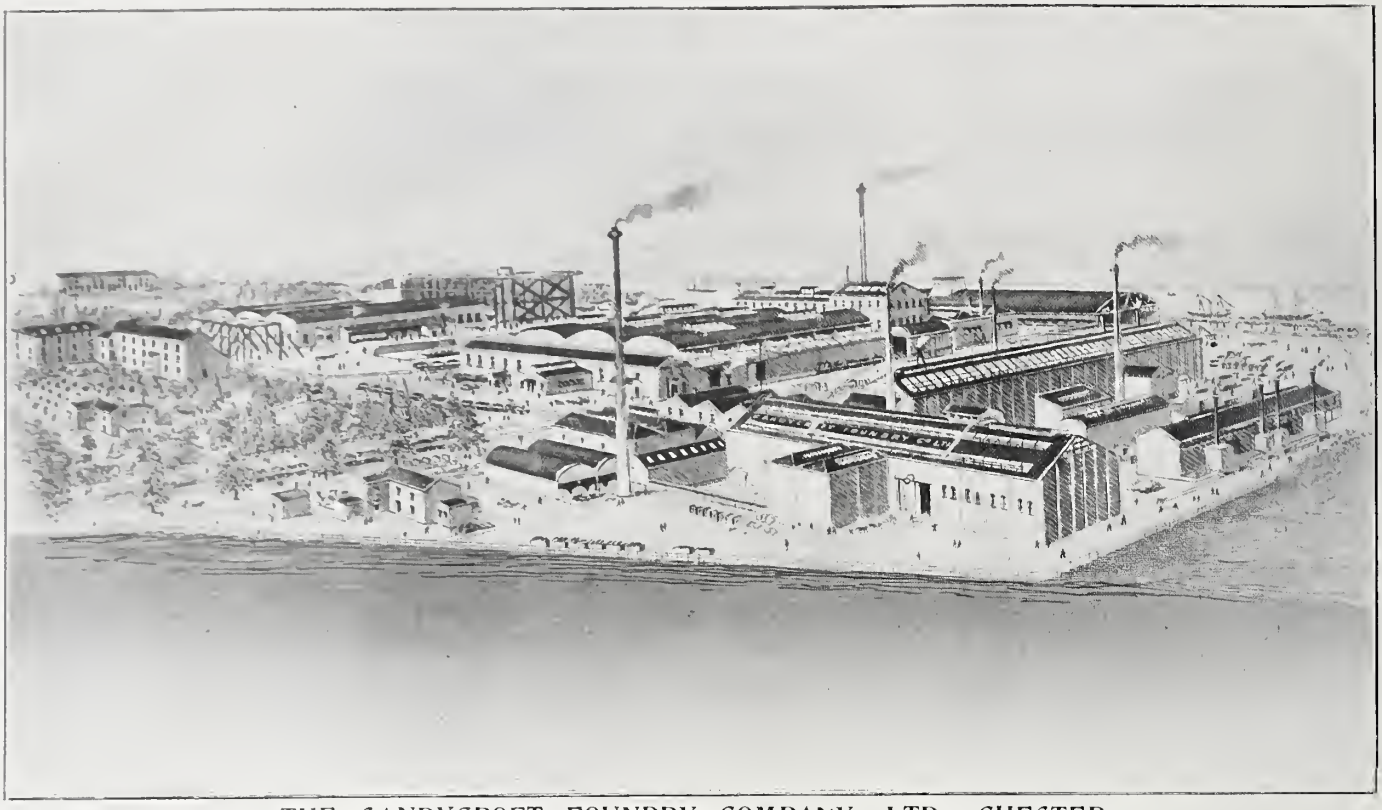
Headquarters depôt, Mr. J. Sanderson (Sanderson's Saddlery), Market Square, Johannesburg.

with its reward in the extensive business that is now conducted in his name. It is some thirty years since Mr. Sanderson first started business in the Cape Colony, but he was attracted to the Rand in the first rush, and he opened the Johannesburg branch in very humble and unpretentious buildings as far back as 1888. As the town grew, so the business progressed, until it had reached its colossal proportions of the present day. Although a large staff of workmen are employed in the local house, the principal manufactory is at Woodstock, in the Cape Colony, and there some 300 hands are employed when the factory is in full swing. The factory is equipped with all the latest machinery, and is capable of turning out from 150 to 200 sets of harness per week, in addition to the manufacture of a very large quantity of saddlery and other goods of too varied a description to enumerate here. The high quality of the firm's manufactures can be judged from the very large number of awards they have obtained at the different shows held in South Africa. They have altogether gained between forty and fifty first prizes for harness and saddlery, and at the Kimberley Exhibition they won the only gold medal offered, competing against all comers. The interior of their depôt at Johannesburg has quite a West End appearance, and is replete with every commodity one would expect to find in a high-class English establishment. Johannesburg becomes naturally the principal business centre, but Mr. Sanderson has branches also in Capetown, Port Elizabeth, East London, Kimberley, Bulawayo, and Bloemfontein, in addition to the factory at Woodstock, and a large warehouse at Walsall, England. A corner block of large dimensions, the headquarters depôt for the Transvaal, an illustration of which is given, carries on the various floors stocks representing and being used up in the numerous branches of work dealt with by Sanderson's. The ground floor, as retail branch, is amply stocked with saddlery, harness, vehicles, sporting goods, and every description of bags, portmanteaux (a speciality), and finished leatherware, wallets, pocket-books, fitted dressing-cases, etc. On the first floor are the wholesale and saddlery departments. The second and third floors are used as carriage showrooms, in which there is a large variety. The basement is used as a workshop, where all the leather goods are kept. Sanderson's have another Johannesburg branch, which is in smaller premises on the opposite side of the Market Square.

Ground-floor interior, headquarters depôt, Sanderson's Saddlery, Johannesburg.

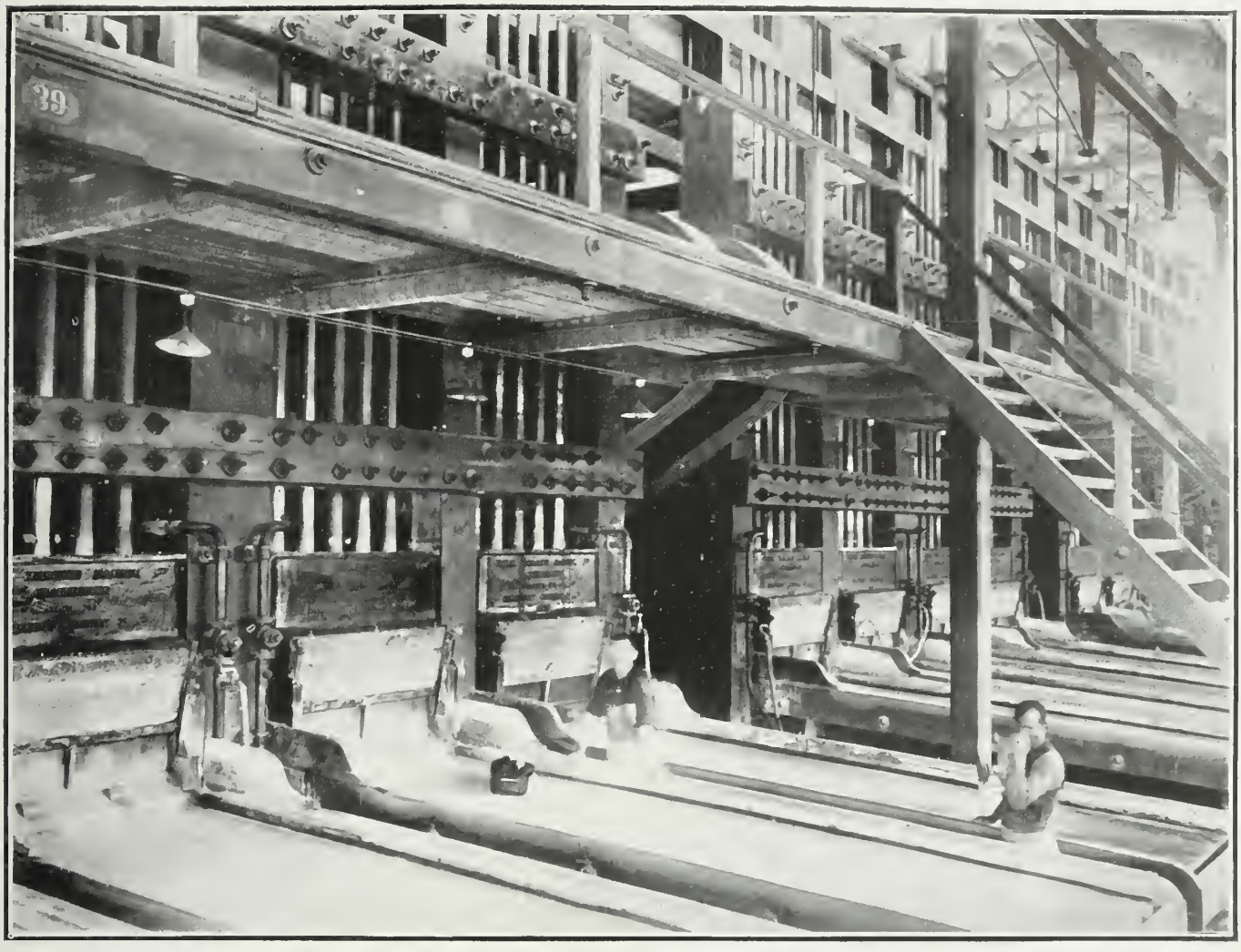
SANDYCROFT FOUNDRY COMPANY, LIMITED.

The Sandycroft Foundry Company, Ltd., is a firm of engineers and manufacturers of mining machinery the name of which is quite a household word, not only on the Witwatersrand, but on almost every goldfield of the world. This is due to the excellent workmanship and the material of which their machinery is made, added to a laudable determination not to supply anything but the very best. Most of the early stamp batteries and reduction plants of the Rand were of the Sandycroft make. The Company has kept pace with the further demand consequent upon the development and extension of the mining industry of the Transvaal, and the Witwatersrand particularly. The quality of its machinery, and the enterprise with which the Company's business interests have been promoted on these fields, are indicated by the fact that at the time of writing (1905) almost one-half of the stamps crushing on the Rand are of the firm's make. This inures it as self-evident that the Sandycroft Company more than holds its own, and is undoubtedly due to the high-class machinery manufactured, giving it consequently a very much longer wear than the machinery supplied by many of the younger firms. The Sandycroft Foundry Co., Ltd., moreover, have to their advantage the important circumstance that they have had almost three-quarters of a century of experience in the equipment of mines, and are always the first in the field with experiments in new machinery, all tending towards perfection. The English works of the Company, situated near Chester, have grown with the mining industry, and now cover an area of about 12 acres. The workshops are equipped throughout with the most modern self-acting and labour-saving machinery, and they are equal to the manufacture of the heaviest mining machinery that it is possible any mines are likely to require. The number of mines completely and partially equipped with machinery by this firm are too numerous to mention. On the Rand, the Simmer and Jack, Robinson Deep, Randfontein, Angelo and Driefontein, Wit Deep, New Kleinfontein, and a great number of others, are running their machinery. In India, the Mysore, Champion Reef, Ooregum, and others are also equipped with the Sandycroft Company's machinery; while in Australia, Brazil, and other parts of the world the firm is equally well known. In view of the developments looming in the future in South Africa, the Sandycroft Company is making great preparations for an increased business, having a large building and yard just outside Johannesburg for storage purposes, with its own railway siding for the



THE SANDYCROFT FOUNDRY COMPANY, LTD., CHESTER.

OFFICES OF THE SANDYCROFT FOUNDRY COMPANY, LTD., JOHANNESBURG.



Battery at the New Kleinfontein, supplied by the Sandycroft Foundry Company, Ltd., Johannesburg.

Interior of erecting-shop of the Sandycroft Foundry Company, Ltd., Chester (England).

easy bringing in and despatch of heavy machinery. An electrical branch of the same firm has been started within the last few years, and is making great headway in spite of the keen competition in this class of machinery. The offices of the Company are in the most prominent business quarter of Johannesburg, being directly opposite the palatial Rand Club, a description of which appears in another part of this volume. The representative of the Company in Johannesburg is Mr. Herbert Briggs, one of the best-known consulting engineers on the Rand and a prominent citizen.

The National Bank Buildings, Pritchard-street, Johannesburg.

(Architects: A. & W. Reid & East, Johannesburg.)

Messrs. HENRY SIMPSON & CO.

The well-known brand "White Seal" whisky issued from the distilleries of Messrs. H. Simpson & Co., of Glasgow and London, has recently been introduced into the Transvaal, and there has been accorded a popularity among connoisseurs which its reputation for first quality easily attains. Messrs. Simpson & Co. have appointed Mr. J. D. Bosman—an old-established wine and spirit merchant of Johannesburg—as their sole wholesale agent for the Transvaal, Natal, and Delagoa Bay. The "White Seal" is the chief whisky supplied to the House of Lords and the Royal Household (which should be an attribute to special merit) and to many of the most noted institutions throughout the United Kingdom. The opinion of the medical press—which speaks of the "White Seal" as a whisky well matured and of extremely delicate flavour—is substantiated by a test on the part of those who may claim to be judges. That it has been well received in South Africa is evident from the fact that it is stocked by most of the clubs and large establishments in the Transvaal. Mr. J. D. Bosman, whose business address is No. 82, President-street, Johannesburg, has been established in the Rand capital for upwards of 15 years, and has attained a first-class reputation among an extensive *clientèle*. In connection with the important agency under notice, he has found it necessary to incur considerable expense in the erection of a special bonding store. Stocks of this whisky are kept at Durban and Delagoa Bay. Since the establishment of the ageney and the appreciation which has been accorded Messrs. Simpson's speciality, local stocks have been found to be insufficient to cope with the demand, and it is necessary to have on hand very extensive supplies. Messrs. Simpson & Co., it may be added, are among the largest whisky distillers and blenders in the United Kingdom.

Mr. F. A. STEVENSON.

Mr. F. Arthur Stevenson is one of the rising architects who settled in Johannesburg subsequent to the war. With the rapid expansion of the town, and the growth of innumerable suburbs, a great demand existed for new, original, or dainty styles of structure for the cottage or villa which is a main feature of Johannesburg suburban architecture; and the artist most successful in combining the picturesque with the utilitarian is bound, in the Golden City as elsewhere, to make his mark. Mr. Stevenson, by a happy fancy, has struck an extremely pleasing idea, in combining the English cottage style with the old Cape Dutch, and the charming residences designed by him, dotted over the suburbs of Johannesburg, are not only restful and pleasing to the eye but are also well adapted to the requirements and conditions of the country. Mr. Stevenson served with the troops throughout the Anglo-Boer war, and settled in Johannesburg in 1903. Since commencing to pursue

his profession he has met with marked success, and his designs will in all probability continue to enjoy considerable popularity. One or two of these are shown in the illustrations accompanying.

TANGYES, LTD.

The firm of Tangyes, Limited, the well-known engineers, established a branch in Johannesburg towards the end of 1889, and they at once assumed a premier position in engineering and mining circles. Tangyes' engines of one sort and another are known all over the world, and long before the goldfields had become a power in the country their oil engines were well known in South Africa. It is even stated that Oom Paul himself had one of these at his farm in the Rustenburg district, while they were also installed in the forts erected after the Jameson Raid; so that Tangyes' *employés* were among the few Englishmen who ever gained access to these exclusive erections under the old *régime*. These same engines, or rather engines of the same type, were largely used by the Royal Engineers for search-light purposes during the war. Tangyes make a great speciality of their engines for agricultural purposes, and these are very largely in use to-day in South Africa. They are suitable for irrigation and pumping works, and can also be used for grain-crushing. Five or six hundred are now at work in the Transvaal, while all over the sub-continent they may be seen in practically daily use by the farmers. This firm was one of the few to overcome the transport difficulties before the building of the railway, and one of their achievements in bringing three boilers each weighing 36,000 lbs. from Charlestown to the Wemmer mine by ox-wagon is worth recording. During the war they erected pumping machinery at the Deadwood Camp, St. Helena, to pump water a height of 2,000 ft. The firm manufactures all kinds of mining machinery, including the Corliss engine, so well known on the Rand. The general manager for South Africa is Mr. J. H. Shillito, who established the business here in 1889.

E. W. TARRY AND CO., LIMITED.

Everyone familiar with mining business on a large scale, whether in the capacity of a shareholder or a worker, knows how vexatious and costly are those breakdowns in machinery which no watchfulness on the part of the most careful of mechanical engineers can completely guard against. The question of how most effectually and promptly to deal with any accident that might occur to some vital part of their working plant is one which constantly urges itself upon the attention of those responsible for the economic development of the mines. It is to deal with matters of this kind that Messrs. E. W. Tarry and Co., Limited, have erected their fine engineering and repairing shops. The history of this big concern is a long and honourable one. Commencing in a comparatively small way, it was founded by the late Mr. E. W. Tarry at Kimberley in the year 1870. Ten years later Mr. Tarry took into partnership Messrs. McKenzie and Anderson, who at that time had an engineering shop at Kimberley. In 1881 the partnership was further extended by the inclusion of Mr. E. C. Rudd, and in 1882 the concern was formed into a Limited Liability Company under its present style, with the head office at Kimberley, branches being established at Beaconsfield and at Jagersfontein in the Orange River Colony. Port Elizabeth in the Cape Colony, and Bulawayo in Rhodesia, were the next points at which it became necessary to open branches. On the opening up of the Rand goldfields in 1887 the Johannesburg business was started,

RESIDENCE IN SUBURBAN JOHANNESBURG.

(Architect: F. A. Stevenson, Arcade Buildings, Johannesburg.)

with branches at Klerksdorp and Krugersdorp, and engineering shops were established at Johannesburg in connection with the ordinary business.

RESIDENCE IN SUBURBAN JOHANNESBURG.

(Architect: F. A. Stevenson, Arcade Buildings, Johannesburg.)

In 1895 the steady development and expansion of the Company's business led to its re-flotation as an English Company with a capital of £300,000, and with head offices at 11, Ironmonger Lane, London, E.C. Of the concern as now constituted, Mr. A. Durant is chairman, the directors being Lord Knollys, Lord Chesterfield, Mr. C. H. McEwen, and Major S. Wynne-Finch. For the general management of affairs in South Africa Mr. H. F. E. Pistorius, who has been identified with the firm since 1877, is responsible, with a local committee at Kimberley. At this latter place the Company's machine shop recently completed a new plant for the Peiser Diamond Company beyond Griquatown. In addition to their machine and engineering works, the Company largely imports mining requisites, and at their fine retail premises in Joubert-street, Johannesburg, is kept a very large stock of builders' tools and furnishing ironmongery of every description.

The Austral Iron Works, owned by Messrs. E. W. Tarry and Co., Ltd., under the efficient management of Mr. H. W. Blanchard, rank among the most important institutions of their class in South Africa. Conveniently situated in a manufacturing portion of Johannesburg known as the City and Suburban, they cover a large area of ground, and have been acquired and equipped with a fine plant at a total cost of something like £100,000. Under normal conditions and when the mines are in full swing, the works give employment to from 100 to 150 European artisans and mechanics, and about the same number of natives, and the wages sheet totals up to the respectable figure of £35,000 a year. Every kind of casting likely to be required by the mines, from the smallest requisite upwards, can be dealt with here with ease, nor are the wants of the general public lost sight of. Strolling around the works one sees pathetic references to the late war in the iron crosses cast to mark the graves of British and Colonial officers and men. Incidentally it may be mentioned, as a matter of historic interest, that the Englishman Edgar, whose death at the hands of a Boer policeman was one of the tragic occurrences which marked the period immediately preceding hostilities, was in the employ of this firm at the time of his death. A claim against the Boer Government for compensation, which lapsed at the close of the war, owing to there being no responsible local authority against whom it could be enforced, was recognised by the British Crown in the form of a substantial annuity to Mr. Edgar's widow. The internal arrangements of these spacious works include drawing, pattern making, moulding, casting, machinery, boiler making, and blacksmiths' shops, and they leave the impression on the visitor that the management is so conducted as to meet the wants of customers with no loss of time, whilst the economic interests of the proprietors are guarded by an excellent system of control in all matters of detail which leaves no room

RESIDENCE IN SUBURBAN JOHANNESBURG.

(Architect: F. A. Stevenson, Arcade Buildings, Johannesburg.)

for unnecessary waste. Mr. Thomas McLaren, the firm's accountant, who has for many years past been associated with the business, is responsible for the whole of the books and records, and is to be congratulated on the admirable method and order with which they are kept by the staff under his control.

Reference has already been made to the retail branch of Messrs. E. W. Tarry and Co.'s extensive business. This is now situated in Joubert-street, Johannesburg, and is in itself a splendid commentary on the development that has taken place in South African trade since the day in 1870 when the late Mr. E. W. Tarry founded the business in Kimberley. Johannesburg is famous for its magnificent shops, and in its way, having regard for the special purposes which it is intended to serve, it would be hard to find anything finer in the matter of a well-stocked furnishing ironmongery establishment than Messrs. Tarry and Co.'s premises in Joubert-street. On glancing through the stock one gets a good idea of the special requirements in this regard, of a population like that of Johannesburg, which includes in its number millionaires and mining magnates with luxurious tastes, as well as a large body of people who enjoy an exceptional purchasing power. Everything in the ironmongery line which a household, furnishing on any scale, requires, can here be procured at a moment's notice; whilst the steadily expanding character of the local building trade is indicated by the stock kept for the supply of builders and contractors, comprising paints, oils, varnishes, and builders' and carpenters' tools of every description.

Exterior of Premises of Taylor & Wilson, Marshall and McIntyre-streets, Jeppestown, Johannesburg.

MESSRS. TAYLOR & WILSON.

The populous suburb of Jeppestown contains many first-class business firms, some of which are quite equal, in point of view of the quality of goods supplied, and in the importance of their transactions, to the more pretentious establishments of Central Johannesburg. Messrs. Taylor & Wilson, grocers and provision merchants, of Marshall-street, Jeppestown, whose premises are situated in convenient proximity to the tram line and to the other important stores of the neighbourhood, have always maintained a high reputation for the quality of the supplies purveyed by them, and for the promptitude and attention bestowed on all orders received. All classes of provisions are stocked by this firm, and the best-known brands of tinned and preserved

goods are obtainable from them, as well as all necessities for the household. Messrs. Taylor & Wilson's firm is a thoroughly reliable one, and house-

Mr. J. W. Taylor in 1895, but in 1902 it became necessary to convert it into a Limited Liability Company, the founder being retained

("Pittsburg" porcelain enamel baths, etc.): Henry S. Northrop, steel ceiling manufacturer, New York (high-class metal ceilings, in copper,

STORE AND OFFICES OF THE J. W. TAYLOR CO., LTD., MARSHALL-STREET, JOHANNESBURG.

holders in Jeppestown deal extensively at this brisk and well-stocked emporium, where a large selection of goods to choose from and courteous attention can always be relied upon.

THE J. W. TAYLOR COMPANY, LTD.

The J. W. Taylor Company, Ltd., are general importers and indenters of builders' and plumbers' supplies (including heating apparatus and sanitary fittings) and metal decorated ceilings, now so much used in modern dwellings and large buildings. The Company's show-rooms are situated in London House, Loveday-street, Johannesburg. The business was established by

as managing director of the concern. It is almost needless to say that all supplies are imported direct from the manufacturers. The Company has a warehouse in Marshall-street, at the corner of the "Robinson Gates," where large local stocks are stored. Steam and hot water heating apparatus is a special feature of the Company's business. In connection with this department are held the South African agencies for the Dominion Radiator Company, Ltd., Toronto (Safford radiators for steam or water); the Pierce, Butler & Pierce Manufacturing Company, New York (steam and hot-water boilers); the Taylor Forbes Company, Ltd., Guelph, Ontario (hardware specialities); the Pierce, Butler & Pierce Manufacturing Company, Syracuse, New York

bronze, or steel); and the McClary Manufacturing Company, Ltd., London, Ontario (stoves and ranges). The accompanying illustrations show some of the goods handled, and the Company's warehouse.

THE TECHNICAL AND COMMERCIAL CORPORATION, LTD.

This firm, recognised as one of the leading engineering houses on the Rand, was established and registered as a Limited Liability Company under the late South African Republic on April 12th, 1897. The head offices of the Company are in Silesia Buildings, 76, Main-street, Johannesburg. The firm was founded for the purpose of catering

for the requirements of the mining industry, as well as for the multifarious requirements of the general trading community. The Corporation is organised on the most modern principles, is in touch with the most enterprising engineering houses in Europe and America, and maintains a large staff of efficient engineers of world-wide experience. Indeed, periodical visits are paid to the principal European and American manufacturing centres, whence up-to-date notions and inventions are collected. The Technical and Commercial Corporation, Ltd., does not confine its studies to the inventions or improvements of any one country. Results have proved that the firm's expert technical knowledge and energetic service have placed it in the foremost rank among the recognised engineering houses of the Rand. A speciality has been made by the Company of labour-saving appliances. To make mention of but one European invention suitable to the existing local conditions, the Thermit welding process may be quoted. By this system repairs to machinery can be readily effected *in situ*—whereby transport and other incidental charges can be avoided. Of local inventions, the outcome of local necessity, we may quote the Henderson-Tucker stope conveyor, a labour-saving appliance which has produced enormous saving of labour at the works of the Geldenhuis Estate G. M. Co. The scope of the Corporation's transactions will be found in the following list of manufacturers which it represents :—

Fielding & Platt (Gloucester), oil and gas engines ; suction gas plants.

Ascherslebener Works (Germany), Schmidt engines and superheaters.

W. H. Allen and Son & Co. (Bedford, England), high-speed engines and condensers.

Pokorny & Wittekind (Germany), compressors.

Sulzer Bros. (Winterthur, Switzerland), engines and high centrifugal lift pumps.

Wilhelmshutte (Germany), winding engines.

James Spencer & Co. (England), machine tools.

Kirchner & Co. (Germany), woodworking machines,

Horsfall Destructor Co. (England), refuse destructors.

Balcke & Co. (Germany), condensers and cooling towers.

Straker Steam Vehicle Co. (England), steam trolleys and 'buses.

Buettner & Co. (Germany), water tube boilers.

Uddeholm Actie Bolag (Sweden), drill steel.

Mannesmann Tube Co. (Germany and Wales), boiler tubes, telegraph poles, piping and mining props.

Manlove, Alliott & Co. (England), Corliss driving and winding engines.

INTERIOR OF SHOW-ROOM OF THE J. W. TAYLOR CO., LTD., LOVEDAY-STREET, JOHANNESBURG.

Head Offices of Siemens, Ltd.; Technical and Commercial Corporation, Ltd.; South African Contracting Association, Ltd.; and Hera Light, Ltd., Silesia Buildings, Main-street, Johannesburg.

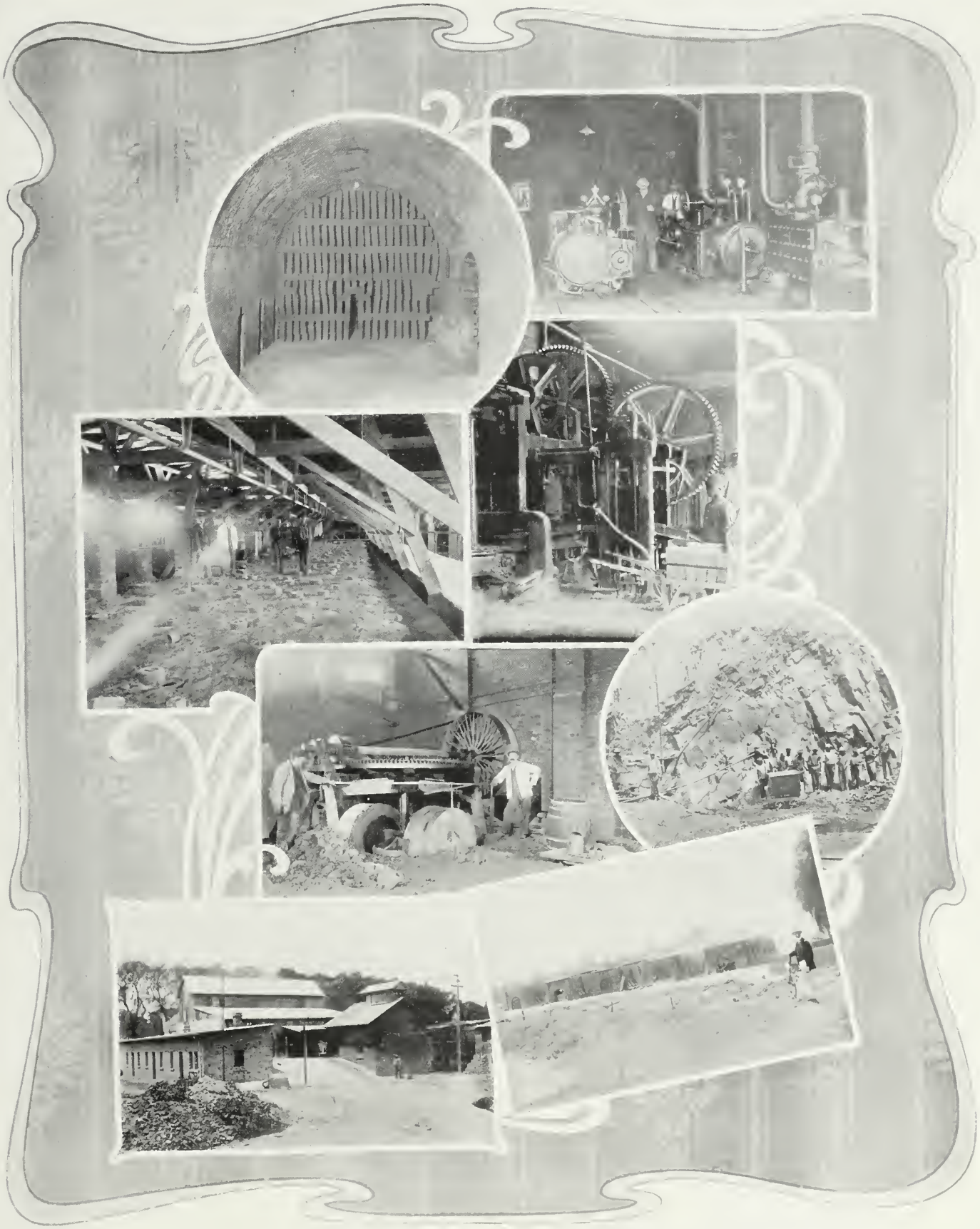
Guttenhoffnungshutte (Germany), steel headgears.
Standard Tool Co. (Ohio, U.S.A.), high-speed drills, &c.
Th. Goldschmit (Germany), Thermit Welding Process.
Alex. Shanks & Sons, Ltd. (Arbroath, Scotland), portable engines and boilers.
H. Breda (Germany), water purifiers.
St. Egydyer & S. Infact (Austria), wire ropes.
C. Hoppe (Berlin, Germany), pumping machinery.

Such important agencies as the above have not failed to achieve popularity on the Witwatersrand, where up-to-date machinery is so essential. The Technical and Commercial Corporation, Ltd., has installed a 700-h.p. tandem compound mill engine—by Messrs. Sulzer Bros., Winterthur, Switzerland—on the Geldenhuis Estate gold mine. The firm has also placed two 500-h.p. engines of a similar class on the Lancaster G. M. Co.'s property, and other two on the Roodepoort Central Deep, Ltd. All of these have proved highly satisfactory, and the economy in working has amply compensated for the substantial price of these engines. In addition the Corporation has supplied many large winding engines equipped with the Kraft valve gear; air compressors with the Koester valve gear; Burthner boilers with their large reserve steam capacity which makes them so suitable for mine hoisting; steel head gears; besides sinking and feed pumps, and other auxiliary plant. A prominent feature in the organisation of the Corporation is its close and intimate relationship with the firm of Siemens, Ltd. The special advantages which accrue to an engineering firm by its close alliance with such a world-famed body of electrical engineers is self-evident. Modern developments render such an alliance daily more imperative, and the Corporation has for years past been in a position to deal with joint electrical and mechanical schemes to the best advantage. The Technical and Commercial Corporation is further provided with a comprehensive mining mercantile department, dealing largely in mining supplies—*e.g.*, picks, shovels, mercury, greases, filter mats, hoses, wood preservative, waste, zinc sheets and discs, wire nails; and, indeed, in every imaginable line of goods likely to be called for. Large stocks are held by this department, whose aim has always been to anticipate the needs of its clients.

There are flourishing branches of this establishment in Capetown and Durban, the former directing its energies chiefly to general trading, and the latter more particularly to agricultural machinery.

SIEMENS, LTD.

This firm was originally founded in 1895 as an agency of Messrs. Siemens & Halske, the well-known electrical engineers of Berlin, under the title "Siemens & Halske, South African Agency." Three years later the firm Siemens, Ltd., was formed under the laws of the Transvaal Republic. The principal agency it then held was that of Messrs. Siemens & Halske, but it subsequently obtained also that of Messrs. Siemen Bros. & Co. Ltd., electrical engineers, of London. In 1903 Messrs. Siemens & Halske of Berlin amalgamated with Messrs. Schuckert & Co. of Nuremburg, under the style of "Siemens-Schuckert Werke, G. m. b. H."; so that now Messrs. Siemens, Ltd., are in a position to supply all manufactures, including specialities, of these expert English and German firms. The Company has command of the services of a staff of exceptional ability which is capable of dealing with the design and construction of any scheme of electric



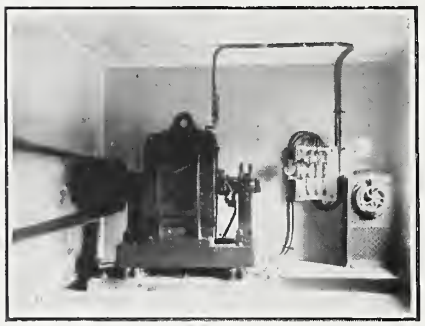
Property of the South African Construction Association, Ltd., Johannesburg.

One of the Chambers of a "Hoffmann" Kiln, Auckland Park Brick Works. Machine House, Auckland Park Brick Works. Top of a "Hoffmann" Kiln, Auckland Park Brick Works. Front View Semi-dry Brick-making Machine, Ophirton Brick Works. Clay Press, Auckland Park Brick Works. Shale Pit, Ophirton Brick Works. Front View of the Ophirton Brick Works. View of Scotch Kilns in different stages of burning, Ophirton Brick Works.

lighting and power works. It has also well-equipped branches in Durban and Capetown. The head offices of Messrs. Siemens, Ltd., are at Silesia Buildings, Main-street, Johannesburg. The directors are Messrs. S. L. Kling (chairman), Lee Murray, M.C.E., A.M. Inst. C.E., M.I.E.E. (managing director), Gordon Sandilands, W. Adye, and E. Becker. The more important orders which have been carried out in South Africa by Messrs. Siemens, Ltd., and their principals of England and Germany, embrace installations at the Rand Central Electrical Works, also for the Transvaal Gold-mining Estates, Ltd., Pilgrim's Rest; the Lancaster and Lancaster West Gold-mining Companies, Krugersdorp; the Central South African Railways; the Johannesburg suburban lighting plant; the Dynamite Factory, Modderfontein; the Pretoria Printing Works, the May Consolidated Gold-mining Company, and the Roodepoort Central Deep. In addition to these contracts the firm has supplied De Beers Explosive Works, Somerset West, with 23 miles of transmission lines; the Table Bay Harbour Works, with a steam generating plant; the Cape Orchard Company, with a complete electrical equipment; and it has also provided the Natal Tea Estates, Kearsney, with full electrical equipment and transmission of power; the Natal Government Railways, with electrical workshops equipment at Maritzburg and Durban; the Natal Harbour Board, and other public works departments in Natal, with generating stations and other installations, and a generating station for the harbour at Lourenço Marques. Messrs. Siemens Bros. & Co., London, are carrying out the contract for the electrical machinery required for the new Johannesburg municipal central station. Messrs. Siemens, Ltd., have since their establishment in South Africa supplied such specialities as electric telpherage, electric winding and hauling apparatus, underground cables, and telegraph and telephone requisites. The Company during its existence has imported upwards of 1,000 generators, motors, and transformers, and it numbers among its customers the majority of the mines on the Witwatersrand, as well as Government and municipal bodies.

THE SOUTH AFRICAN CONTRACTING ASSOCIATION, LTD.

Brick-making has become one of the most important industries in South Africa. This in a measure may be accounted for by the fact that the country is scarce in stone suitable for building purposes. Known deposits of good building stone are comparatively few and far between, or lie at great distances from the centres where the material is required. Wood and iron structures, again, are not the most desirable for human occupation in a warm climate, and a country of extremes in temperature. For many years the primitive process of producing bricks made by hand and afterwards sun-dried has been in operation in South Africa, but the Association under view has been foremost with the enterprise in placing machine-made bricks on the market, with gratifying success. The venture was started in 1898. The daily output of bricks from the Braamfontein factory now totals to 40,000. There is also a great demand for shale bricks from the works at Ophirton. The South African Contracting Association is fortunate in having at its disposal an unlimited quantity of plastic clay which is especially adaptable for brick-making.



An 80 h.p. Siemens Motor, driving the centre plant by current from Brakpan, Ophirton Brick Works.

The two factories are equipped with the best modern machinery. In the firm's showrooms there are on view excellent specimens of bricks of all shapes and colours—red, blue, terra-cotta, and plum-coloured—also samples of pressed facing and moulded bricks. In July, 1905, the firm re-opened its old brick works at Ophirton for the manufacture of shale bricks, as the clay deposit had been worked off during the last twelve years. Orders for bricks of this special process are now numerous. The plant includes brick-making machines for the semi-dry process. The power supplied in these works is from the Rand Central Electric Works, Ltd., Brakpan. Bricks burnt here have been submitted to tests in water, and have shown an absorption in 48 hours of only 6 per cent.—believed to be unique in South Africa as showing the good quality of the article manufactured.

HERA LIGHT, LTD.

The promoters of the Company known as the Hera Light, Limited, founded in Johannesburg in 1898, were undoubtedly the pioneers in South Africa of acetylene gas as a means of lighting. The Company originally introduced an apparatus manufactured in Europe, which, although the best the world's makers could produce, yet was a product of a newly-born industry. Many of these "Old Type Hera" apparatus were soon erected in different prominent buildings in various towns in the Transvaal and Natal, and the great possibilities for an acetylene and gas industry in South Africa were clearly shown. The word acetylene, however, had still an ugly sound with many people. Vague reports of serious accidents which occurred in European cities had created a certain fear of this gas. When in the year 1888 Mr. J. L. Wilson of New York accidentally discovered the actual nature of the combined substance now known as Calcium Carbide ($Ca\,C_2$) and the fact that a gas eminently suitable for lighting purposes could be formed simply by bringing this manufactured substance into contact with water, the very simplicity of so easy a process resulted in the manufacture of apparatus and in installations by incompetent people in different European countries. Legislators in various countries speedily set to work, and laws were introduced which fully met the urgent requirements of the moment; and the confidence of the public, after having suffered a great shock, was in a very short time fully restored. Since the manufacture and erection of acetylene gas generators and the installation of acetylene gas lighting plants have been placed under certain reasonable rules and restrictions, there are only very few accidents to be recorded as caused by this gas, and these have been satisfactorily explained as having been caused by flagrant stupidity. With this lighting plant which meets all requirements, the possibility of accidents is reduced to a minimum. The Hera Light Company manufacture their apparatus in Johannesburg, and it has been a constant aim on their part to produce one which will work automatically and at the same time be reliable and absolutely safe. Numerous plants have been installed in the Transvaal, and in every instance have met with approval and success. An important item in this industry is the supply of a good quality of calcium carbide, and it has been found that the carbide

THE THOMA BREWERY, BRAAMFONTEIN, JOHANNESBURG.

Contractor Mr. J. B. JOHNSON, JOHANNESBURG.

which is imported by the Hera Light Company is eminently suitable for the apparatus manufactured by them. Various portable types of acetylene lamps are now in use by contractors and miners, and are much appreciated, the old method of a paraffin flare being productive of enormous quantities of heavy smoke from which the Hera lamp is free. These local industries should certainly be fostered, and in this respect the Hera Light, Limited, deserve the success which has followed their efforts in the past. The firm's record includes complete installations at the large residence, stables, and schools on Mr. W. Gouws' farm at Frederikstad in the Transvaal; St. Augustine's Church (Church of England), Doornfontein, Johannesburg—where an electric lighting system was superseded; the estate of Mr. Charles Newberry, Prynsberg, Orange River Colony—where there are over 100 lights; and the Ebenezer Mining property, Jagersfontein, O.R.C.

THE THOMA BREWERY.

The Company which to-day owns and carries on the extensive business at the Thoma Brewery, Braamfontein, Johannesburg, was originally started by Mr. Anders Ohlsson in 1883, at Capetown, and in 1889 was floated into a Limited Liability Company styled Ohlsson's Cape Breweries, Ltd. Their breweries in Capetown and suburbs alone include the Newlands Brewery (probably the largest in South Africa), the Mariedahl Brewery, and Anneberg Brewery. At Newlands the Company purchased the famous springs, and recently introduced pneumatic maltings. The Thoma Brewery, Braamfontein, was purchased in 1902. The directorate of the Company at present consists of Messrs. Algernon L. Elwes (chairman), J. H. Brodie, Gerald Buxton, R. B. Lloyd, Anders Ohlsson (the founder), and Olof Alex Ohlsson. The latter, at the time of the annual general meeting of the Company in 1904 was elected to the Board as joint managing director with his father, Mr. Anders Ohlsson, on account of the extension of the Company's business in Johannesburg having so greatly increased the work devolving upon the Managing Director that such an appointment was rendered necessary. The reserve capital of the Company was then assessed at £730,000. Rising to a position of magnitude and importance on parallel lines, so to speak, with the advance of Johannesburg from a mining dorp to become afterwards the hub of South African commerce, the history of the Thoma Brewery is replete with interest. Mr. Thoma first started the brewery which still bears his name in 1892 with a copper capable of dealing with only 50 gallons. So meagre was the supply, so limited the founder's financial resources, that he personally had to vend his refreshment from one beer shanty and hotel to another, with natives pushing a wheelbarrow loaded with a few barrels. Finding favour among his customers, and having accumulated a little capital, Mr. Thoma then engaged the services of Mr. W. Schenk, who had learned his business in Germany, Norway and Sweden, and had also visited France and England. This was in 1894 when a larger copper was introduced. Two years later, finding that he could not cope with the sale, Mr. Thoma purchased another copper of a thousand gallons capacity. With the advent of 1898 further purchases and extensions enabled the brewery to double the supply. Then war soon after was announced, and all work *pro tem.* was suspended. After the expiration of 18 months permission was obtained from Capetown for the importation of malt, hops and other necessaries. Work was soon resumed. Negotiations were entered into with Mr. Anders Ohlsson of Capetown, which resulted in the purchase of the brewery by his Company. Mr. Thoma then retired to take up his permanent residence in Paris. Mr. Schenk, who had acted as head brewer for Mr.

I. AND II.—ACETYLENE MINE LAMPS.
III.—ORDINARY AND SAFETY ACETYLENE MINE LAMPS.
IV.—MINE LAMP ADAPTED AS GENERATOR FOR TABLE LAMP.
V.—MINE LAMPS DISMANTLED FOR CLEANING; HERA LIGHT, LIMITED.

Thoma, was retained by the Company to supervise the production of the beverage. Immediately afterwards the coppers were increased to a capacity of 3,000 gallons, and early in 1904 this was again doubled, with the result that (working the 24 hours through) 20,000 gallons can be produced daily. As against the old wheelbarrow of Mr. Thoma's early days, 25 horse and mule trolleys are employed and two steam trolleys. But here the brief history does not cease. With the vast increase in the population of Johannesburg, the facilities afforded by the railways in various directions, and with the increasing acquaintance the inhabitants of the surrounding districts have with Thoma beer, the directors have found it necessary—indeed incumbent upon them—to practically treble the size of their buildings and introduce an entirely new plant. These new buildings, which are in course of erection, will be equipped with all the latest patents in brewer's machinery and with enormous storage and fermenting cellars. The idea is to be able to keep in stock a sufficient quantity of beer in the course of fermentation, so that consumers will not have it retailed to them until it has been reserved for at least six months. It is therefore contended that by this withholding of the stock "Thoma" when sold will compare more favourably with any lager beer manufactured on the Continent, in Britain or in America.

An inspection of the Thoma Brewery not only proves an interesting study, but would convince the most fastidious that from start to finish the greatest precautions have been taken to put before the public a beer absolutely free from bacilli and entirely pure, the hygienic methods adapted being of the most modern. On arrival at the buildings the bales of hops are placed in a cold storage hall, while the malt is stored in a similar apartment above. The yeast is subjected to a treatment something similar to pasteurising, by which means all bacterial life is rendered extinct. Town water is never used, five artesian wells having been sunk, and one at a depth of no less than 500 ft. After the beer is partially brewed it passes from the copper through a cooling chamber in which nothing but sterilised air is utilised. From thence it is pumped into the chip casks—of which there are 150, of an average capacity of 2,200 gallons each—in halls kept at a temperature of nearly zero. To counteract the accumulation of carbonic acid gas in these casks the Company introduced a system of connections from one cask to another in order that the pressure might be regulated to whatever was desired. The fermenting room, situated over the chilling cellars, is elaborately fitted out. The process adopted in maintaining a low temperature in the fermenting tuns is simple. Ice water is pumped from a large tank through a two-inch pipe, and is made to circle round the interior of each tun before returning to the ice tank. From time to time analyses are taken until the brewer is satisfied that the standard is correct.

OHLSSON'S THOMA BREWERY (old Buildings).

The casking and bottling departments have also had special attention. On the return of casks from hotels, bars, etc., they are thoroughly cleansed with hot and cold water, and inspected. Subsequently they are passed on to what is called the "pitching room," where under great heat they are practically enamelled inside with a preparation of pitch, immuning the beer afterwards from outside contamination. This may, to an outsider, seem an unnecessary detail, but in reality it is only in pursuance of their studies of hygiene, and the working out of same. With regard to bottling

the process in vogue is adapted from the latest German methods. The bottles as they are received are passed in iron cases through a trough of boiling water which removes all the labels and slackens any consolidation of foreign matter which might have accumulated within. The insides are immediately scrubbed and cleaned so that not a vestige of foreign matter is left. They are then syringed with cold water and allowed to dry. The

LAGER BREWERY, NEWLANDS.

YARD, NEWLANDS BREWERY.

filling of the casks and bottles is carried out in what may be described as a universal style. Still another further and yet important point must not be overlooked. Subsequent to the beer being bottled it is placed in a tank which is a facsimile of those used in the course of the washing of the bottles. Here it is brought up to a high temperature, again reduced to a minimum, and allowed to stand maturing until it is known to be in an unimpeachable state of purity, condition, and palatableness.

Turning aside to the controlling machinery in use at the Brewery, a little explanation is necessary with regard to how the details are worked from the engine house to other parts of the buildings. Prior to the acquisition of the Thoma Brewery by Ohlsson's, Ltd., the refrigerating plant was capable of freezing 15 tons daily, but almost simultaneously with the transfer being effected a new De la Vergne engine was imported from New York, this making the capacity equivalent to the freezing of 50 tons per day. These were augmented, and the total power available now would solidify 65 tons daily. Warrington pumps are used throughout the Brewery. Electric lighting is supplied from the Company's own dynamos. It may be mentioned that in the new building the refrigerating plant will be equal to the manufacture of 215 tons of ice daily, and instead of three 40-H.P. engines as at present utilised there will be six of 70-H.P. each. This article would not be complete without reference to the housing of the employés engaged in the Brewery, which is carried out on the lines of the Sunlight Soap Factory and those of Messrs. Cadbury, Ltd., England. The Company has a large number of stands in proximity to the Brewery, and the houses thereon are let to the European employés at a nominal rental. The natives are compounded in premises over the stables, and are inspected by a medical officer weekly. The horses and mules are stalled in splendid buildings apart from the Brewery, and the services of a competent veterinary surgeon are retained.

THE ANNEBERG BREWERY.

MESSRS. THURSTON & CO., LTD.

Sport and athletics of every description and games of skill and of chance appeal strongly to the average South African, and especially to Johannesburgers. Therefore it is not surprising that the firm of Messrs. Thurston & Co., Ltd., should have established a branch of their time-honoured business in the leading town of the sub-continent. Nearly all the sporting clubs in the Colony are fitted out with Thurston's billiard tables. The firm has supplied sporting material to the various institutions in the Transvaal almost from the commencement of the history of the country, but only permanently established itself in Johannesburg since the war. The head office for South Africa is at Capetown ;

there is a branch at Durban; and Transvaal and Orange River Colony orders, and those for adjoining territories, are dealt with by the Johannesburg house. Messrs. Thurston & Co.'s large workshops in Johannesburg employ many skilled artisans, and workmen are sent to all parts of the country to fit up and repair the billiard tables supplied by the firm, no fewer than 270 of which have been provided and fitted up in and around Johannesburg itself since the war. The Central South African Railways have an elaborate organisation for providing athletic recreation for the Department's employés; and all railway recreation rooms, where billiard tables are used, from Komati Poort to Kronstad, have been fitted up by Messrs. Thurston & Co., Ltd. As the firm, in addition to billiard-room requisites, stocks tennis, polo, golf, croquet, cricket, fencing, and gymnasium apparatus, these railway recreation clubs are very completely and perfectly equipped. The Ramblers' Club, the Gordon Club, and the Bloemfontein Club, at Bloemfontein, procure all their sporting stock from this firm, and the mines recreation rooms along the Witwatersrand are similarly supplied. The billiard-room at Government House was fitted up by them, as also were those of the military cantonments, Pretoria, where fifteen billiard tables are in use. The cantonments at Potchefstroom, and others in the two new Colonies, and the best-known hotels, from Waterval Boven and Waterval Onder in the Eastern Transvaal to those at Klerksdorp and Potchefstroom in the west, are all equipped with Thurston's stock. Workmen despatched by the firm to fix up tables or to undertake repairs are all expert men. A very interesting feature of the firm's work, and one of extreme importance to the community, is that connected with fire-extinguishing appliances. They are sole agents in South Africa for Messrs. Merryweather & Sons' motor-chemics, motor-steamers, and every other appliance for fire fighting furnished by these world-famed makers. The Johannesburg Fire Brigade as well as those of the other principal Transvaal municipalities, have been supplied with their fire appliances of the most scientific description; many of the private dwellings and newer and more important buildings in Johannesburg —Cullinan Buildings, Exploration, Corporation, and Sacke's Buildings, among others—are fitted with Messrs. Merryweather's plant for use in emergency. Of the latest fire-extinguishing contrivances may be mentioned the "Eureka," one of the powerful agents for quelling an outbreak of fire, even such as might result from spilling or exploding of mineral oils, where water is useless. The London house of Messrs. Thurston & Co., Ltd., was once the only establishment manufacturing billiard tables, and the founder introduced the slate bed table. The entire output of billiard table slate from Lord Penrhyn's quarries at Bangor is absorbed by the firm. William IV. and the late Queen Victoria were both patrons, the billiard tables at Windsor Castle, Osborne, and Buckingham Palace being by these makers. The London premises of Messrs. Thurston & Co., Ltd., are now in Leicester Square. Of the table at Buckingham Palace, it may be related that it was made of wood recovered from the wreck of the *Royal George*, supplied by Her Majesty Queen Victoria for the purpose; and two other tables were also made from this wood.

THE TRANSVAAL MOTOR GARAGE.

The capital of the Witwatersrand, with its wonderful developments and business avidity, has always held a reputation for enterprise, and local conditions have naturally necessitated the adoption of the quickest means of transit. Consequently demand has sprung up for the best makes of motor vehicles by professional and commercial men to whom every minute of the business day spells money. It is doubtful whether there is another city in the world that can, in proportion to its population, surpass Johannesburg for the number and smartness of such equipages. It is, therefore, interesting to know something of the leading firms supplying motor cars in this centre. The Transvaal Motor Garage (proprietors, Messrs. Carr Bros. and Ash, Ltd., of London and South Africa) may be specially mentioned in this

Premises of Carr Bros. & Ash, Ltd., Johannesburg.

regard. The premises are in Kerk-street, Johannesburg. The firm has always on hand a comprehensive stock of petrol and steam motor cars and other motor vehicles, and undertakes to procure any make of car to order. Messrs. Carr Bros. and Ash, Ltd., are the Johannesburg agents for Wolseley, Siddeley, Darracq, and Speedwell cars, Quadrant motor cycles, Samson treads, Price's lubricants, Ducellier lamps, and Carless petrol. Every motor accessory is stored, and there is a permanent staff of engineers who are qualified to undertake repairs on any make of motor. All cars and cycles imported by this firm are specially built for the South African climate and roads. The many clients of Messrs. Carr Bros. and Ash invariably express satisfaction with their investments. Mr. Harold Gill is the courteous manager of the firm's business in Johannesburg.

Works of the United Engineering Company, New Doornfontein.

UNITED ENGINEERING COMPANY, LTD.

The United Engineering Company, Ltd., is one of the oldest machinery houses established on the Rand, having started in 1888 as the agency of Friedrich Krupp Grusonwerk, and then only handling the productions of this firm. As, however, the mining industry grew, it was found necessary to furnish not only battery parts, &c., but complete mining equipments. In order to accomplish this the following firms arranged to form the United Engineering Co., Ltd. :—

Friedrich Krupp, Essen.
Friedrich Krupp Grusonwerk, Magdeburg-Buckau.
Sachsische Maschinenfabrik (Saxon Engineering Works), Chemnitz.
Friedrich Wilhelms Hutte, Mulheim o–Ruhr.
Union Electricitaets Gesellschaft, Berlin.
Ludwig Loewe & Co., Berlin.
Felten & Guilleaume, Mulheim o–Rhine.

With such a powerful combination, including the largest German manufacturers, it became possible for the Company to supply all mining machinery proper, such as batteries, crushing and concentrating machinery, from the celebrated firm of Friedrich Krupp Grusonwerk; engines, boilers, from the well and favourably-known Sachsische Maschinenfabrik (Saxon Engineering Works), Chemnitz; winding engines from the Friedrich Wilhelms Hutte; electrical machinery from the "Union" Electricitäts Gesellschaft; machine tools from Ludwig Loewe & Co.; and wire ropes, &c., from Felton & Guilleaume, Mulheim o–Rhine.

As was but natural, the business of the Company under these conditions increased enormously, so that to-day the firm is one of the largest in the trade.

The United Engineering Company has always been in the front rank in introducing new machines and processes in the industry. It brought out the Blake-Denison weighing machines, Morris slimes pumps, and the first wet

View of Construction Yard, United Engineering Company.

grinding tube mill in South Africa. It also furnished the first steel headgears of modern design.

Since the war the use of steel construction has come into much more extensive use, and owing to this the Company was compelled to start a workshop in Johannesburg for the construction of structural steel, which has ever been on the increase since, being fully equipped with the most modern and up-to-date machinery for cutting, punching and drilling of plates, channels, and girders of all dimensions.

Besides the regular business of importing mining machinery, large stocks of all mining supplies are carried by the Company in the extensive premises in Doornfontein, so that the requirements of the mines, builders, and others can be expeditiously met.

To-day the United Engineering Company, Ltd., represents the following firms :—

Friedrich Krupp, A.G., Essen.
Friedrich Krupp, A.G. Grusonwerk, Magdeburg Buckau.
Sachsische Maschinenfabrik (Saxon Engineering Works), Chemnitz.
Friedrich Wilhelms Hutte, Mulheim o-Ruhr.
Felten & Guilleaume, Mulheim o-Rhine.
R. Wolf, Magdeburg Buckau.
Ludwig Loewe & Co., Berlin.
Schäffer & Budenberg, Magdeburg Buckau.
Morris Machine Works, Baldwinsville, N.Y.
S. Denison & Sons, Leeds.
W. A. Granger, London.
Klein Engineering Company, Manchester.
Charles Burrell & Sons, Thetford.
Capel & Co., London.
T. & W. Cole, London.
Berlin Erfurt Machine Works, Henry Pels & Co., Berlin.

The main Johannesburg offices of the United Engineering Company are in Marshall Square.

THE UNITED TOBACCO COMPANIES (NORTH), LIMITED.

The largest cigarette-manufacturing Company in South Africa consists of the world-famous exporters of cigarettes—viz., The American Tobacco Company, Imperial Tobacco Company, W. D. and H. O. Wills, Lambert & Butler, John Player & Sons, Ogden's, Ltd., Richmond Cavendish Company, F. & J. Smith, J. & F. Bell, W. & A. Churchman, &c., &c.. The large imposing structure near the City and Suburban Company's property at the foot of Marshall-street, Johannesburg, designed with turrets after the style of an old castle, is a landmark in town. Within it some 150 persons find employment in the manufacture of cigarettes for the United Tobacco Companies (North), Ltd. The factory was first started in Johannesburg in December, 1894, under the name and title of the Acme Cigarette Co., for the manufacture of cigarettes from the tobacco of Messrs. W. D. & H. O. Wills, Ltd., of Bristol, England. This business was acquired under an agreement on September 30, 1905, the parties to which were : the American Tobacco Co., Ltd., the British Tobacco Co. (South Africa), Messrs. A. Holt, H. Holt, and D. Holt, and Messrs. Holt & Holt, Ltd. The North Company was then formed with a capital of £135,000. The directors appointed were : Messrs. H. H. Wills, W. B. Ogden, H. von R. Cunliffe Owen, T. Gracey, J. Hood, L. Hignett, A. Holt, H. Holt, and D. Holt. The registered offices are in Cecil Chambers, Strand, London.

Workmen, United Engineering Company.

The manufacture of cigarettes as undertaken in Johannesburg is carried out in a most scientific manner. The process is on the following system :— The tobacco is evenly spread from a large receptacle on a slowly revolving belt which passes between rollers, ensuring a uniform thickness in the layer, which falls slowly into a wedge-shaped box, from the bottom of which it is carried along a groove to where it meets the paper. This specially-prepared paper is affixed to the lower portion of the machine in bobbins (each containing a length of about three and a half miles of paper). The paper on leaving the bobbin to meet the tobacco passes through an automatic printer which methodically stamps the brand of the cigarette upon it at regular intervals. As the tobacco slides on to the paper the edge is made adhesive with a preparation of starch and water. The continuous roll runs onward until it passes through a cutting machine, this working at the rate of 450 revolutions per minute. The finished cigarette is then sorted out and laid away to dry. At the ordinary rate of working, these machines are capable of turning out the enormous quantity of three-quarters of a million cigarettes daily. Above the factory room some 130 girls and boys are engaged in the work of packing the cigarettes in the familiar tinfoil wrapper, placing them afterwards into packets, the packets then into boxes, and wrapping these up ready to be placed in the store room. The manager, Mr. S. Gillespie, informed a representative that the demand for these cigarettes is constantly increasing. A

company under similar management is erecting another large factory at Capetown, where all the popular brands of tobaccos and cigarettes will be manufactured. In Johannesburg the Company does not rely on the Municipality for much in the direction of water supply or lighting, as with a Tangye engine and boiler they drive their own machinery and their own electric lighting dynamo, and pump water from a deep well sunk alongside the property. The best-known brands of cigarettes produced by the Company are "Three Castles," "Flag," "Pinhead," "Cinderella," &c., &c.

PREMISES OF THE UNITED TOBACCO CO., LTD., MARSHALL-STREET, JOHANNESBURG.

Messrs. HENRY WAGNER & CO.

The business carried on by Messrs. Henry Wagner & Co. is one connecting the South African buyer with British and foreign manufacturing and export firms. The founder of the firm is Mr. Henry C. Wagner, who commenced business in Capetown in 1901, and proceeded to Johannesburg in 1903. Mr. Wagner's commercial experience includes six and a half years' travelling in the United States and eight years on the Continent. He proceeded to South Africa with the intention of representing Austrian firms only, but on discovering, after two years spent in the sub-continent, that there was an enormous demand for British and German goods, he made a special trip to Europe to secure agencies from leading firms in the United Kingdom and on the Continent. Mr. Wagner has travelled over the whole of British South Africa in the pursuit of his business, his experience of the country including Cape Colony and Rhodesia, Natal and Delagoa Bay, as well as the two new Colonies. He visits personally, two or three times a year, the towns of Pretoria, Durban, Pietermaritzburg, East London, Bloemfontein, Queenstown, Kingwilliamstown, Grahamstown, Kimberley, Bulawayo, Salisbury, and Lorenço Marques, with a sample range of between 30 and 40 trunks. The firm continually receives samples of the latest goods suitable for the South African market, and a great part of Mr. Wagner's responsibility consists in advising the respective firms represented by his house as to the articles most likely to attract custom. His knowledge of this important detail is specially extensive and valuable. So rapidly has the business of the firm increased, owing to the constant succession of new lines introduced to meet requirements, that the sample ranges became too heavy for transport on the original method, and the establishment of sample rooms became a necessity. These were permanently fixed in Johannesburg, and the services of Mr. Hall, whose experience of trade in New Zealand and China made him a valued co-operator in the firm's work, were accepted as partner. Mr. Hall's task is the management of the head office and the permanent sample rooms in Johannesburg. He became a member of the firm in 1905. The house has permanent sample rooms also in Capetown

and Port Elizabeth. To give some idea of the extent and diversity of the firm's operations, the following list of goods handled may be quoted:—Furniture, glassware, hardware, enamelware, crockery, cutlery, lamps, stoves, carriage lamps, ladies' and gentlemen's outfitting and haberdashery, motor cars, musical instruments, gramophones, leather, leather fancy goods, furs, karosses, beads, ostrich-feather goods, artificial flowers, inks, water-colours, lead pencils, stationery, pictures, picture frames, pipes, blankets, shawls, etc., cameras and photographic apparatus, oil paintings and advertisement articles: in addition, German export beers, Rhine and Moselle wines, German and French champagnes, French clarets, brandies and liqueurs, preserved provisions, and German, Belgian, and Dutch cigars and Egyptian cigarettes. A representative of the firm is in attendance at all sample rooms.

WAGNER & CO.'S SAMPLE ROOMS.

Messrs. W. WALKER & SONS.

This business was started in South Africa ten years ago, and during the period of its existence has furnished and fitted many—it may be said most—of the Government offices, banks, hotels, municipal offices, chambers of mines and commerce, and other important buildings, from the Cape to the Zambesi. The premises in Johannesburg consist of several stores, containing four spacious showrooms. The very large stock always held is housed in the cellars in Wilhelm-street. The workshops are on the opposite side of the street to the store. The present heads and owners of the business are two brothers, and the headquarters and manufacturing centres are at Bunhill Row, London. A stroll through the showrooms of Messrs. Walker & Sons reveals many beautiful specimens of furniture in the Adams, Sheraton, Chippendale, Heppel White, William and Mary, Jacobean, Henri II., Louis XVI., Empire, and Renaissance styles. Architects' designs are carried out, or special designs, coloured or otherwise, furnished, some of these being original and of great beauty and distinction, others again being replicas of famous existing panels, fireplaces, and other fittings and furnishings in well-known houses or institutions in all parts of the world. Ornaments of real Japanese china, bronzes, and other quaint and exquisite articles, form part of the stock. Each article at this emporium is numbered to facilitate the repeating of any order, but choice or special designs are manufactured to order in the factories at Bunhill Row. A large assortment of Japanese wall-papers, tapestries, and other decorative hangings is kept in the establishment. The reputation of the firm in England is too well known for any doubt to exist that a branch of this important concern would maintain a high excellence in all work entrusted to it. Everything stocked in the shape of furniture is entirely from the firm's London factories.

Messrs. W. C. WINDOVER, TURRILL & SONS.

This well-known and important firm of carriage builders and harness makers has its Johannesburg establishment at the corner of Commissioner and Joubert Streets. The head offices are at 22 and 23, Long Acre, London, W.C., where the business was started over a century ago, in the year 1796. In addition, there are also in London well-stocked showrooms at 66, 67, and 68, South Audley Street, and the manu-

PREMISES OF W. WALKER & SONS, JOHANNESBURG.

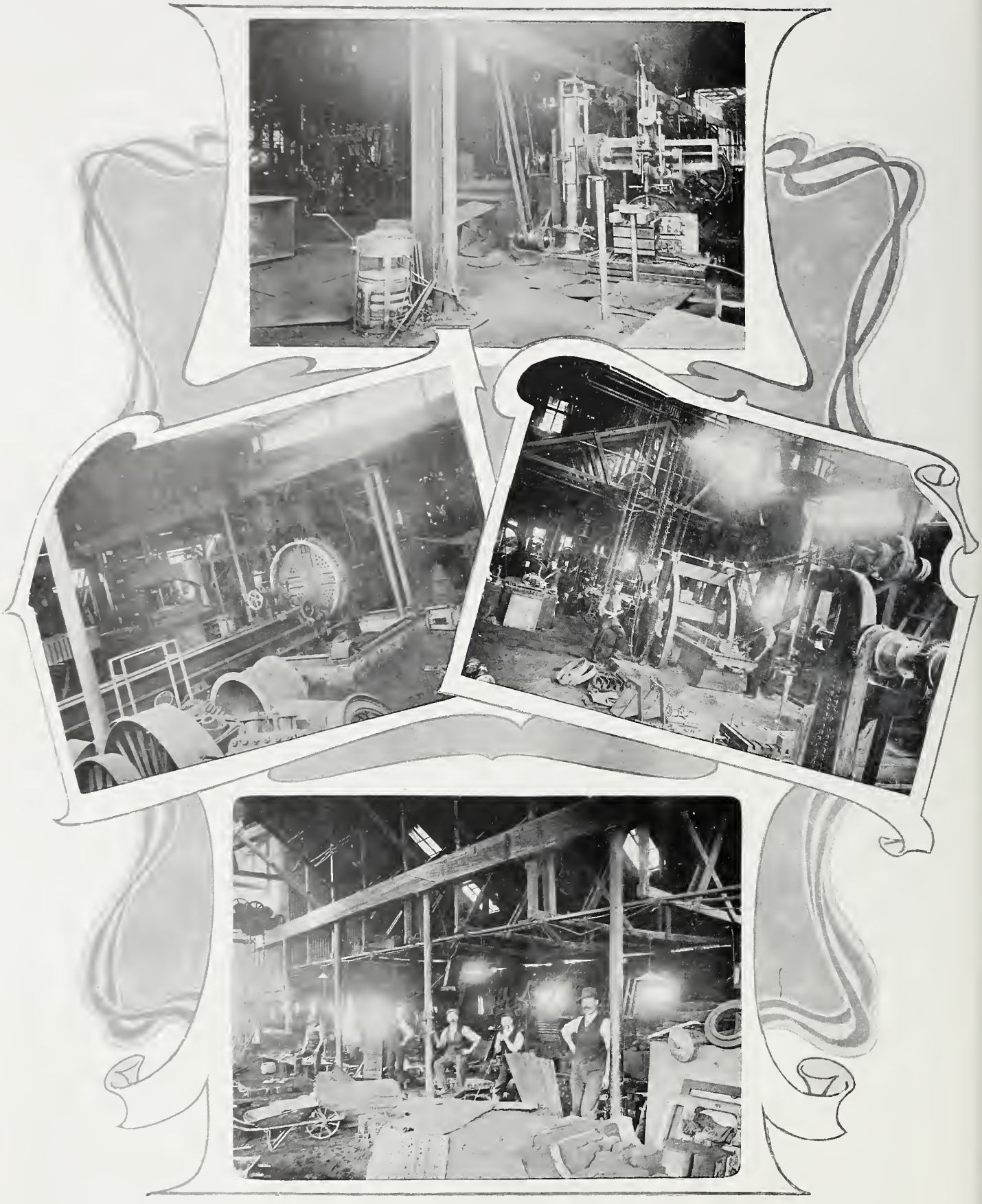
factory is in St. James's Road, Croydon. Branches of the firm include not only the Johannesburg depôt, but also agencies in all the chief towns in South Africa, two of the leading ones being at Capetown and Pretoria. There is another agency in Bombay. This firm claims the reputation of being the pioneer English coach-builders in South Africa. As the principal, Mr. Wm. Clement Windover, has lived a considerable number of years in India and South Africa, the firm naturally possesses a special knowledge of the timbers best suited for the requirements of carriage-building for tropical and sub-tropical climates. A reasonable claim also is a perfect familiarity with the quality of construction required in vehicles to be used over the rough roads of South Africa. Messrs. Windover, Turrill & Sons have been represented in Johannesburg for a period dating several years prior to the Anglo-Boer war. They built the late ex-President Kruger's famous State coach, and, as might be expected of coach-makers to His Majesty King Edward VII., they have secured highest awards at the Paris, Capetown, and other Exhibitions. Every facility is provided at the firm's Johannesburg works for carriage construction and repairs, and also for the manufacture of harness and saddlery. The workmen in every department are selected with discrimination, and are considered to be among the best qualified in their different trades. Mr. Windover, it may be mentioned, is the inventor of the Cardross Car, the Reyntens-Serge buggy, and the Clement landau

Johannesburg Branch—Windover, Turrill & Sons.

Messrs. WRIGHT, BOAG & CO.

Messrs. Wright, Boag & Company, engineers, of Frederick-street, Johannesburg, are still another instance of the large businesses that have grown up from small beginnings in the Transvaal. The firm consists of Messrs. John Wright, Peter Boag, and Allen B. Mackay. To add a touch of the Homeland to their business, it has been named the Clyde Engineering Works, and the extent of their workshops may be gauged by the statement that they cover a block nearly an acre in extent in Marshall's Township. When business was first started, some fifteen years ago, one stand 50 ft. by 50 ft. sufficed for shops and offices, so that the size of the present premises is a sufficient indication of the rapidity and extent of the growth of the works. They principally devote themselves to meeting the requirements of the mining industry, and for this purpose have introduced some of the most up-to-date engineering machinery in South Africa. They are now in a position to execute, on their own premises, all the varied classes of work required by the mining companies. Foundry work has a large share of their attention, and they are amongst the largest manufacturers of foundry castings in South Africa. General engineering work of all descriptions is undertaken, for municipalities, breweries, builders, millers, printers, and local industries generally. Particular attention has also been given to the requirements of those engaged in diamond-drilling, and the

Showroom, first floor—Windover, Turrill & Sons, Johannesburg.



WORKS OF WRIGHT, BOAG & CO., JOHANNESBURG.

firm now turns out large quantities of drilling requisites in competition with the imported article. A large number of skilled mechanics are employed in the various departments of the Clyde Engineering Works, and, extensive as the business is at present, the firm still looks forward to considerable expansion.

MAIN ROAD, FORDSBURG.

WITWATERSRAND TOWNSHIP, ESTATE, AND FINANCE CORPORATION, LTD.

In the early days of gold mining on the Witwatersrand, the town of Johannesburg, which has been described by one of the pioneers as "a wilderness of sand and tin," occupied but little space, and afforded small scope to those of the gathering population who aspired to having something in the nature of a home somewhat more remote from the business and mining quarters. It was quickly perceived by those who had wit and enterprise that a large overflow was bound to ensue, and that whoever made the first preparations to meet the requirements of this overflow would be well rewarded. The result of this perception was the expansion of the town into residential suburbs, some of which, densely crowded with an alert population, with streets of stores and warehouses, lines of trams and omnibuses, and railway stations of their own, must have amazed by their rapid development and extension even those who planned and founded them. The earliest of these suburbs to spring from the veld, and still the largest and most populous, are Jeppestown and Fordsburg, the one high up and to the east, the other to the west of Central Johannesburg. These suburbs were named after their founders, Mr. Jepp and Mr. Ford, who shrewdly realised that in these directions lay the natural development of the town—which would, of course, be expected to follow the reef. Since that time other suburbs and townships have sprung up, with wonderful mushroom growth, within what is now the Johannesburg municipal area, though none have rivalled in growth or population the two that first provided comfortable dwelling-places, gardens, and public recreation grounds for the workers who made Johannesburg their home. The suburbs of Fordsburg and Jeppestown, which are the property of the Witwatersrand Township, Estate, and Finance Corporation, Ltd., head a long list of other properties owned by the same Company, including Belgravia, Bellevue and Bellevue East, Wolhuter, Malvern, Kew, North Doornfontein, and Spes Bona. Some of these have only been laid out recently, while others already carry a large population. The Corporation owns large interests in many parts of South Africa, from Capetown to Pretoria, and is seldom unsuccessful in its ventures, having a reputation for sound finance and straightforward business methods which ensure respect wherever its name is known.

FORDSBURG.

The suburb of Fordsburg is a western extension of Central Johannesburg.

The principal thoroughfare in Jeppestown—Marshall-street.

It is probably one of its most populous suburbs, and has a large number of stores and business premises, but on the other hand it carries a greater proportion of the working population, and fewer of the class that reside in villas, than the eastern and northern suburbs. Numbers of the business structures of Fordsburg are substantial and well built, being in many instances two or three storeys in height, with a prosperous and busy appearance. The local trade is large. The population is in the main of Dutch nationality, with a considerable scattering of English. A constant service of trams run between Fordsburg and the town, and renders communication easy. The area of the suburb is 140 acres.

JEPPESTOWN.

The main streets of Johannesburg running due east and west along the line of the reef penetrate Fordsburg in the one direction, and the suburb of Jeppestown in the opposite direction. These streets — Commissioner-street, Fox-street, Main-street, and Marshall-street—form the main thoroughfares of Jeppestown, and along them run the lines of trams and 'buses for the conveyance of passengers from the town to this suburb and those beyond. Jeppestown comprises a very large part of the present municipal area of Johannesburg, and in addition to rows of up-to-date stores and business premises of all descriptions, substantially built, there is a considerable "villa" population comprising all classes of the community. Rents are comparatively low in Jeppestown, and residential homes, ranging from those of the artisan class to such as would be suitable for wealthy people, are equally available. The township lies above the mines, and has been well and suitably designed, with spacious public grounds planted with trees and flowers. Of these open spaces, the Oval (where stands the memorial of the late Mr. Jeppe, sen.) and the park are laid out

THE JEPPESTOWN CLUB.

The Hall. The Billiard Room.
The Reading Room. Mr. C. Westbrook's Office, Fraser-street, Johannesburg.

as gardens, which greatly increase the attractions of the adjacent houses. The "Plein" is a fine open space. Jeppestown presents many advantages

MADDISON-STREET, JEPPESTOWN.

and attractions to the ordinary citizen. The high situation, good streets, and excellent service of trams, the first-class stores and low prices prevailing, combine to make it a very desirable residential quarter. There can be no doubt that the foresight and judgment displayed in the selection of this section of ground as the site of an extension of the town has been more than justified. The area of Jeppestown is 340 acres.

THE JEPPESTOWN CLUB.

The Jeppestown Club, inaugurated in 1903, is a social club for the inhabitants of the suburb of Jeppestown. Its membership, which numbers upwards of 300, is rapidly increasing. The Committee consists of seven members, Dr. Johnson Brown being the chairman. The premises are situated at the corner of Gus-street and Commissioner-street, and are well-appointed and comfortable. The billiard room contains two excellent tables by Burroughes & Watts, and there are well-furnished reading and card rooms. The entrance fee, which has been reduced since the establishment of the Club, is well within the reach of residents whose social position in the prosperous little suburb qualify them for membership. The Club is under the management of Mr. Charles Westbrook, turf commission agent, a well-known sportsman. Mr. Westbrook is an acknowledged personality in sporting circles, both in England and Australia, as well as in South Africa. He started life on the London Stock Exchange, and at a subsequent period of his career was one of the leviathans of the Australian turf. For three years he was in partnership with Joe and Barney Thompson. His offices in Fraser-street are a popular *rendezvous* of the sporting community.

BELGRAVIA.

Marshall-street, continuing through Jeppestown, runs from end to end

BELGRAVIA, JOHANNESBURG.

of the further suburb of Belgravia. Formerly this was separated from its more populous neighbour by a division known as "Belgravia Gates," which no longer exists, although the spot where the gates stood still retains its name. No shops or business premises are allowed to be erected, and nothing is permitted to disturb the quiet serenity which prevails throughout this most charming suburb. The streets are wide and well constructed, and are planted with trees; the houses are all a certain prescribed distance apart, each having therefore its own plot of ground for garden or tennis-court. The situation of Belgravia is beautifully sheltered, lying on a gentle slope which ensures good drainage, higher than the surrounding suburbs. Belgravia is beautifully set off with avenues of trees in every direction, giving a shaded peaceful appearance, providing shelter from the fierce sunlight, and scenting the air with aromatic odours. In this township is situated the stately residence of Mr. Julius Jeppe, which was used as the official Johannesburg headquarters of the Commander-in-Chief during the war. The Anglican Church of St. John's has been erected by the strenuous efforts of the residents of the suburb, and close to the boundary between Belgravia and Jeppestown is S. Mary's College for Girls, which serves both townships equally well. The social life of Belgravia is select and pleasant, and as a residential suburb it is possessed of unequalled advantages.

PORTION OF MALVERN AND BELGRAVIA.

MALVERN.

One of the newest suburbs of Johannesburg, and one of which the most confident hopes have been formed, is the Malvern township, which lies to the north and east of Belgravia. It includes over 2,000 stands, which will be sold in such manner that the freehold can be acquired on easy terms and within a reasonable period. Malvern stands as high as to command, in one direction, a view over the Doornfontein valley, and in another a still more beautiful and extended expanse, over Rosherville Lake to the hills in the Heidelberg district. Seven acres in the centre of the estate have been reserved for the Government, on which no doubt buildings devoted to public purposes will be erected. A further piece of seven acres has been presented to the Government and to the public, near the western boundary on the town side, on which it is purposed to build the long-promised permanent establishment for the Jeppestown High School for Boys and Girls, an institution which has established a very fine record, and which is certainly deserving of this excellent site. The residential portion of Malvern suburb will be laid out so as to ensure harmony

MARSHALL-STREET, BELGRAVIA.

of aspect and comfort, and the means of communication with the town will be the best that can be arranged. The new electric tram service will almost reach the eastern boundary of the township, and the thoroughfare through which it will run, Jules-street, which is 2¼ miles long in a straight line, is planted with four rows of trees. This street will probably be devoted to business purposes. Two railway stations are also within easy reach for residents in this township—Denver and Cleveland. The train service is regular and frequent.

BELLEVUE AND BELLEVUE EAST.

High above the pretty little township of Doornfontein and Bertram's, and out through Yeoville, lie the very favourite suburbs of Bellevue and Bellevue East. The growth of these two extensions has been phenomenal. Where, one year, tracks across the open veld, with an occasional house for a landmark, were all that guided the wanderer in this locality, the next year beheld streets and houses in rows, gardens, and trees, a plentiful population, and a certain number of necessary stores. These suburbs are exceedingly healthy and bracing—looking down, on the one side, upon the beautiful Bezuidenhout Valley, and on the other upon the fertile slope and plantations of Orange Grove, and away to the Magaliesberg beyond. Wind-swept and clean, cool and free from noisy traffic, the demands for stands for building, or for residences to be rented, in these suburbs, has been exceedingly brisk. A very large population from Doornfontein, Hospital Hill, and Yeoville has already settled in Bellevue and its sister suburb. There is direct connection with the town lighting and water schemes, and the electric tram service is within easy reach. A good private school for boys has been established, and the Johannesburg College is also in close proximity, while good schools for smaller children also exist. The area of Bellevue is 193 acres.

KEW.

The latest addition to the suburbs created by the enterprise of the Witwatersrand Township Corporation, Ltd., is Kew. This estate is to the north of Johannesburg, and is situated just outside of the limits of the municipal boundary. At the time of writing it had not yet come upon the market. It is believed, however, that, owing to the extremely desirable situation, an absence of municipal rates, the fertile soil, and the facility with which water can be obtained, there will be an immediate and plentiful demand for stands in this district.

Country Towns of the Transvaal.

Amersfoort.

The go-ahead little settlement of Amersfoort, originally founded as a "kerksplaats" by the Rev. Lion Cachet (whose name betrays his Huguenot extraction), is dependent for its prosperity on the wool trade, which is carried on in a brisk and bustling fashion. Before the late war it was a neat, thriving, stone-built "dorp," but was burnt out and destroyed during the course of military operations, and has since been in process of re-building, repairing, and general restoration. As the business of re-stocking the farms and re-organising the farming industry is bound to be tedious, the population of Amersfoort may be said to have been undergoing a period of unusual depression, but there are good hopes of a speedy improvement and a resumption of former prosperity. The town is situated in the centre of the picturesque and salubrious district of Wakkerstroom, between the Elandsbergen and Blauwkop, an ideal spot for stock-raising. Indeed, throughout this most healthy region fever and stock diseases are less known than in any other part of the Transvaal. The "dorp" is thirty years old, and the area of the town lands is 3,250 morgen, including the actual township of 200 erven. The population, when the census was taken in 1904, was recorded as 168 whites and 53 coloured. Amersfoort was first proclaimed a township by the Republican Government, and an Urban Board was established in 1897, which in 1904 was constituted a municipality, with a Council of five members, Mr. Albert Kuit being elected Chairman. This body, not having had time to accomplish much before the outbreak of the war, has since drafted the necessary bye-laws, organised a sanitary service, carried on a proper system of road-making and repairing, and entered into an undertaking with the Irrigation Department for very urgently-needed waterworks, for which latter purpose a loan was raised at 6 per cent. repayable over a period of 21 years. In an address to the Council in September, 1905, the Chairman congratulated the town on the economy with which these urgent matters had been conducted, seeing that the Council had had to start from the very beginning without funds, instead of taking over from a Health Board, as was mostly the case with new municipalities. The water scheme should shortly be completed, and will add considerably to the value of property. Mr. Albert Kuit, Chairman of the first Council, has lived in the district for twenty-one years, and is a member of the firm of G. Kuit & Son, financial and law and general agents. He is of Dutch descent, and has taken a very prominent part in local politics since 1902. The town owes much to his energy and enterprise. Amersfoort has a Government school and an independent school, a Dutch Reformed Church occupying the centre of the town square (after the recognised traditions of the Dutch settlers); and a steam mill. The Government buildings are of the usual description. The leading members of the Wakkerstroom Agricultural Society, including their President, Mr. A. G. Robertson, have their headquarters in Amersfoort ward; and this ward is also the stronghold of the local "Het Volk," its Chairman, Mr. J. A. Joubert, residing here.

View of the Township of Amersfoort, Wakkerstroom District.

Amersfoort Municipal Council, 1905-6.

The principal Street in Amersfoort.

Messrs. A. G. & V. L. Robertson.

The farms "Rolfontein" and "Maquabie," in the Wakkerstroom district, were formerly owned by Mr. Robertson, sen., and are now held by his two sons, Mr. Alfred George Robertson and Mr. Vincent Leopold Robertson. The estates are separate, but the brothers have a common interest in the sheep with which the farms are principally stocked. The farms cover an area of 19,000 acres, and at the commencement of 1906 the

stock consisted of some 6,000 sheep, 400 head of cattle, and 50 or 60 mules. Prior to the late war the farms carried 4,500 sheep, 1,200 cattle, and 400 horses. About 1,000 acres are under cultivation, producing principally mealies and oats, which are devoted entirely to feeding the stock, although a big trade could be done in mealies if railway transport were available. Experiments are being carried out on these farms in lucerne crops, and hitherto have shown most satisfactory results, as lucerne can be grown as a "dry" crop. Other excellent forage grasses which efforts are being made to acclimatise include the Australian paspalm, dilitatum, sanfoin, burnett, fescue grass, and sheeps' parsley. Ensilage (of mealie stalks and other succulent vegetation) has been very successfully cured both above and below ground, and gives good results for winter feeding. The owners of these two farms have imported Tasmanian Merino rams and 150 ewes for breeding since 1903, thereby greatly improving the quality of the wool produced. These sheep acclimatise quickly, and thrive well on the natural veld: the wool is fine, and of superior quality. The fleece averages 7 lbs., and sells at Durban at from 7½d. to 9½d. per lb. The situation of this part of the Eastern Transvaal, on the Elandsberg range, with an altitude of from 5,000 to 6,000 ft. above sea level, is healthy and admirably adapted to fruit culture. Insect pests are rare, and there is no better spot for this purpose in the Transvaal. The average rainfall is a little under 30 inches, and the rainy season extends from October to April. The farms "Rolfontein" and "Maquabie" have about 200 varieties of fruit trees, principally deciduous, and the Messrs. Robertson watch with interest all fresh experiments in fruit-growing on the Government experimental farms. In developments carried out by themselves they are preparing to lay out large orchards of such varieties of fruits as have proved suitable to the soil and climate of the district. Messrs. Robertson are the founders of the local Agricultural Society, the elder brother being chairman at the time of writing.

Rams bred by Messrs. Robertson Bros., in the Wakkerstroom district from imported Australian Stock.

Making an Incubator-house on the Farm "Rolfontein" (Messrs. Robertson Bros.), Wakkerstroom district.

Amsterdam.

In the valley between the Setola and the Compise rivers, and under a sheltering range of hills running north and south, lies the peaceful little town of Amsterdam. Here in this fertile well-watered valley all descriptions of produce can be raised without much difficulty. Good streams abound, and the cutting withering winds that are so prevalent on the High Veld are mitigated by the protecting hill range. Fruit, such as peaches, apples, and pears, may be grown almost in perfection, and healthy stock can be raised in abundance. But Amsterdam labours under the heavy disadvantage of being far from any market for its produce, the nearest point on the railway being 60 miles distant. The township of Amsterdam was founded in 1884, and was laid out by Messrs. M. Walker and S. T. Erskine, Government Surveyors. The town lands embrace 1,130 erven, and the commonage consists of 3,600 morgen, including 10 allotments of 200 acres each. The streets are 80 ft. wide. The taxes for occupied erven are 30s. per year; for unoccupied erven 10s. There is a population of 200 whites. A Government Free School has been established, but the independent Dutch School has a far larger attendance. An Urban Board was granted to the town in 1904, and in 1905 it was constituted a Municipality. The Council consists of four members, Mr. David Purcocks being Chairman at the commencement of 1906. Banket reef running through the town lands surface, assays of which, made by Professor Prester, came

Sackville-street, Amsterdam, Transvaal.

Members of the Urban Board, Amsterdam Transvaal.

ont at 2½ dwts. to the ton, have been traced, and are considered by some as being similar to the Rand series.

Barberton.

Prettily embowered, and nestling in the north-eastern corner of the Kaap Valley, in the shadow of high and protecting hills, there stretches Barberton—the first gold Eldorado of South Africa that history quotes. And, though the more continuous richness of the Rand that was subsequent now overshadows the importance of this auriferous centre, there clings to the name of the place we review a halo of romance which is not easily equalled in the world. Its age is only 20 years—before, its site and environs were only virgin veld and kopje—and its birth was in the idle blow of a disappointed prospector's hammer. In 1882 there were numerous rumours afloat of the presence of gold on the Kaap Plateau and in the surrounding country, and when, two years later, auriferous reefs had been proved, the country around Pioneer's Hill was proclaimed a goldfield. There was then the usual influx of every class of adventurer into the neighbourhood, and the most feverish activity prevailed among the pioneers. The property which has since been known as Moodie's had the first arduous attention of the prospectors, but as the investigations of these were frequently of indifferent success, many left that alluvial territory for further private enterprises throughout the district. Among those were the brothers Barber, and one of the two, while at rest on trek, crashed his hammer on a rock by which he sat. Knowing something of geology, he immediately saw that the exposed quartz was exceptionally rich in the metal of which they were all in search. His thoughtless stroke was the nucleus of the famous Sheba mine, which, during its life, has given a phenomenal yield. This discovery, and the attendant results, in a few months developed a township that, naturally enough, came to be known as Barberton, and with marvellous rapidity buildings sprang up in straggling street form, the uneven thoroughfares being constantly thronged by eager seekers after fortune. But with the honest there came the unscrupulous company-promoter of the "rigger" type, and the latter class had not much trouble in those days of impetuous speculation of "looping in" the ingenuous. It was not only in South Africa, but all over the world, that the wealth of the Sheba was sung of, and capital was lavished upon any venture of the kind that was projected upon the public. The inevitable reaction followed—precipitated by the operations of the fraudulent syndicates; the ignorance of the diggers of strata sequence; and the "rush" to the Witwatersrand, which was considered to be a much more payable exploitable area. It may be remarked, *en passant*, that the Barberton of those early and exciting days was very different from the one we are familiar with now. By the beginning of 1887 it had, indeed, developed into a town of open

The "Switzerland of South Africa": view from the Railway Station at Barberton.

Members of the Barberton Municipal Council, 1905.

PANORAMIC VIEW OF BARBERTON.

structure which spread from under the Saddleback to Lomas's Ridge, while in the east and west respectively residences of some pretension were being erected on the Berea and in Belgravia. However, the Kaap Valley was luxuriant in rank vegetation which, with its rotting, was a persistent source of malaria, and this fact gave an unhealthy reputation to the locality which exists erroneously to-day. For years there has been a periodical burning of all noxious growths, and there have been other sanitary precautions introduced which have had a highly salubrious effect upon climatic conditions. At the present date, while there is a risk of fever in the low-lying parts of the fields, and along the lower portions of the river, the town itself, which stands 2,800 ft. above the sea level, is a resort which has proved beneficial to invalids. Semi-circular in the scheme of its formation, it is pleasantly situated in the shelter of a spur of Kaapsche Berg, and the view commanded is magnificent, reminding one of the grand beauties of Switzerland. The striking amphitheatre of the Kaap Valley, the strong contour of the "Duivel's Kantoor," and the rugged outlines of the Devil's Knuckles —30 miles distant—are prominent contributories to the vista, and the Lomatie Falls and the Devil's Bridge also have attractive interests. The near surroundings are diversified by creeks that meander among the hills with welcome rock and wood shade, and by clumps of eucalypti, cacti, aloes, the "Pride of De Kaap," and an endless variety of ferns (including the tree fern), other sub-tropical trees, plants and flowers. Game is plentiful, and the naturalist, especially the entomologist and the botanist, need not desire a more prolific neighbourhood for his studies. The curse of horse and cattle sickness has, by interfering with transport, considerably hampered agriculture, but the valley is extremely fertile, and there is every facility offered by soil and weather for fruit, vegetable, and tobacco farming, in fact a shrewd and observant farmer can grow crops all the year round. To revert to the matter of mining, it is gratifying to note that what may be called the second era of Barberton's prosperity is in progress, and that with the modern management of such properties as the Worcester, the Ivy, and the Adamanda, the reduced expense of extraction, and the direct railway communication of only 136 miles to Delagoa Bay, there is every probability that the future of the district is secure, especially when one remembers the recent high assays of "black sand" and of the possible returns from magnesite deposits and the coal-bearing areas in the vicinity of Komati Poort. The local institutions include the Barberton Rifle Association, the De Kaap Agricultural Society, the Caledonian Society, the De Kaap Mine Managers' Association, and the Chamber of Commerce—the first Chamber to be founded in the Transvaal. The Mayoral chair was filled in 1904–5 by the Rev. J. B. Knowles, Rector of All Saints, who had the distinction of being the only clergyman in the Transvaal upon whom that civic dignity had been thus far conferred. The town of Barberton

DE KAAP CLUB, BARBERTON.

The Market Square, Barberton, in a quiet moment.

is 283 miles from Pretoria by rail; the population at the last census (1904) consisted of 1,368 Europeans and 1,440 natives and coloured; while the population of the district, exclusive of the town, was 1,274 white and 23,456 coloured. The record of mortality for the municipality of Barberton for 1904 was 5·85 per 1,000.

Mr. G. G. DUNCAN.

The business ramifications of Mr. G. G. Duncan in the Eastern Transvaal are numerous and extremely comprehensive in their catering capacity. The headquarters are located in Barberton, where there are no fewer than four stores, each exceptionally well stocked with goods of different kinds. For instance, one is devoted to crockery and glassware, a second contains clothing and the other usual sartorial requisites, a third is replete in groceries and provisions; the fourth is a general produce establishment. In addition to these town branches, however, there are three stores in the surrounding district, and in connection with the whole there is a smartly-appointed and efficiently-staffed bakery. Obviously Mr. Duncan enjoys a most extensive patronage, and the requirements of his business necessitate the employment of a large number of white people and natives. It may be easily imagined that such an organisation could not be built up in a year or two; as a matter of fact it is almost 20 years since it was inaugurated.

Business Premises of Parker Wood & Co., Barberton.

HARDWARE AND GENERAL STORES OF G. G. DUNCAN, BARBERTON.

PREMISES OF TOBLER & CO., BARBERTON.

Mr. Duncan, who is one of the pioneers of the De Kaap district, has brought his business to its present stage of development by unremitting energy, skill, and perseverance.

Messrs. TOBLER & CO.

The public of the Eastern Transvaal have materially proved the catering capacity and stability of Messrs. Tobler & Co. during the past four years, and the firm is now recognised as one of the most reliable purveyors of drapery goods. As outfitters, tailors, and dressmakers—to instance specialities—Tobler & Co. have made for themselves an enviable reputation, and the business they have commanded since the war has urged the establishment of a wholesale store at Komati Poort. The business of the firm also extends into Portuguese territory, where it has an extensive connection. Mr. Tobler himself superintends the working of the Delagoa Bay branch, and Mr. Archibald is in charge

PANORAMIC VIEW OF BELFAST, TRANSVAAL.

at Barberton. The London representatives are Messrs. Straub and Co., whose offices are at Nos. 6 and 7, Barbican, E.C.

Belfast.

Belfast, one of the smaller municipalities of the Transvaal, is situated in the Lydenburg district, on the main line of railway from Pretoria to Delagoa Bay, from which places it is distant 136 miles, and 258 miles, respectively. The township was founded in the year 1890, on the farm Tweefontein, the property of Mr. R. C. O'Neil. It consists of 888 erven, laid out in blocks of twelve, the size of each erf being 240 by 120 Cape feet. The streets are 100 ft. wide, and run north and south, and east and west. The elevation is 6,700 ft. above sea level, and the town enjoys a healthy, braeing climate. As a municipality, Belfast stands in the enviable position of having neither assessment rate nor debt. The Agricultural Department has acquired about 1,600 acres of the town lands, on a perpetual lease at a nominal rental, for the purpose of making a plantation. There are also Government reserves for the quarters of the South African Constabulary and for educational purposes. Four plots in the town, each the size of one block of erven, are reserved for church purposes. The total area of the town and the adjoining town lands is 3,750 morgen. There is excellent summer pasturage for sheep in the neighbourhood; cattle thrive, and horse sickness is practically unknown. Fruits of temperate climates flourish in the district. Oats, barley, and potatoes are the principal crops. Traces of copper have been discovered about eight miles from Belfast, but at the time of writing development work had not been sufficiently carried out to enable the value of the discovery to be ascertained. There is iron in the Steelpoort Valley, and an abundance of coal elsewhere in the district. The latter is worked on a large scale on a property adjoining the town lands. At Zwartkoppies good house coal is found near the surface. There is a limestone quarry 20 ft. in thickness on Rietvlei, about eight miles from Belfast.

A monument was erected in 1890, on the east of the town of Belfast, to commemorate the defeat of Dingaan by the Boers, and a feast is held annually in connection with the event.

To Belfast, in 1900, some 3,000 Boer women and children — residing in Johannesburg at the time of the British occupation—whose male relations were still on commando, and who were living on the relief supplies provided by the military authorities, were despatched by order of the Commander-in-Chief to be handed over to their own people for support. These women and children were "dumped" down by Louis Botha at Barberton, and there abandoned. On the occupation of that town by the troops, they were thrown once more on to the hands of the British authorities. The

MEINTJES-STREET, BELFAST.

BOLT-STREET, BELFAST.

GOVERNMENT OFFICES, BELFAST.

episode is deserving of mention as being the only attempt to force the Boers to provide for destitute families of their own nationality. Bergendal, about three miles from Belfast railway, is of historical interest as being the position where the Boers made their last organised stand against the British troops. A monument marks the kopje where the Johannesburg police (a mounted Boer corps) were almost annihilated.

Benoni.

One of the most successful and promising townships on the East Rand is that of Benoni, which was founded by the Kleinfontein Estates & Township Company in 1904. To a great extent the success attained is attributable to the geographical position, Benoni being a freehold estate, surrounded by many of the finest gold mines on the Witwatersrand. Here

THE CYCLE AND MOTOR WORKS OF CATO BROS., BENONI.

are situated the Kleinfontein group of mines, one of the largest groups on the Rand, which, under the able management of Mr. E. J. Way, gives employment to a very large staff. There were at the end of 1905 some 600 residents in the township of Benoni, and the population is increasing with exceeding rapidity. A line of railway runs near the township, connecting at Benoni Junction with the Springs-Johannesburg line, and although it has only been used for conveying material to the mines, it was hoped at the time of writing that in the near future passenger traffic would be conducted over it.

The Kleinfontein Estates Company offered to advance the Government money for erection of Magistrates' Court, Post Office, Police Barracks, etc., but had the assurance that money for Public Buildings would be placed on the estimates early in the coming financial year.

Numerous re-sales of stands have taken place at Benoni, at profits ranging from 25 per cent. to 300 per cent., but in no case at a loss. The latest transaction of which the writer is cognisant is the sale of two stands at the eastern end of the township for the sum

The soil at Benoni is excellent, being fertile and not stony, and the stand title secures full mineral rights, which are considered by many as most valuable.

CATO BROS.

The Kleinfontein Cycle and Motor Works, Benoni, was established on the 1st September, 1905, by Messrs. Cato Bros. The business is contained in newly-erected premises situated in the centre of the Kleinfontein property. Stocks including the latest designs in cycles and accessories are

BUSINESS PREMISES OF GINSBERG BROS., BENONI.

and a station established near the township.

The policy pursued by the directors of the Estate Company has been to sell in absolute freehold on easy terms. The bulk of the stands sold (over four hundred) have been purchased by people living in the neighbourhood, who know and appreciate the township's prospects. Benoni already boasts of a Government School, which in 1905 was found to require almost immediate enlargement, a Masonic Temple, and numerous fine private residences.

of £480. The township has been planted with trees, and many thousands were to be put in during the rainy season. Arrangements are being made for the establishment of a Municipality, which is urgently required. The Rand Water Board had at the time of writing passed estimates for a supply of water to the township, and in a few months the scheme was anticipated to become an accomplished undertaking. A racecourse is being laid out, which promises to be one of the finest and most successful outside of Johannesburg.

kept. Repairs are the special line of the firm. Mr. Cato the proprietor is well known in the district, having resided there for upwards of four years. He was the first cycle and motor mechanic to establish in the district. As a member of the Johannesburg Motor Cycle Club he takes an active part in all their races and sports. Mr. H. Cato is a New Zealander by birth, and arrived in South Africa in 1901, and served through the latter portion of the war then in progress. Upon the conclusion of hostilities he was engaged as manager of Mr.

Dorning's Benoni branch of the East Rand Motor Works, which position he held until he commenced business on his own account.

Messrs. GINSBERG BROS.

In the Benoni district one of the principal stores is that conducted by the above-named firm, of which Messrs. Max, Joseph, and George Ginsberg are partners. These gentlemen have been associated with Springs and Benoni since 1892, and have watched the gradual development of these parts from that date. That they have every confidence in the future of Benoni is evident by the erection of the large block of stores situated on the road from Benoni township to the Van Ryn Estates, near the Kleinfontein group of mines. In addition to the firm's own store, which occupies the largest portion of the block, there are the premises of the National Bank, Mr. H. Marksman's bottle store, and the Federal Cold Storage and Supply Company. Messrs. Ginsberg's spacious warehouse is replete in every department with a first-class stock of goods. The drapery and outfitting branch contains an excellent selection of dress materials, boots, clothing, hosiery, etc., while the furnishing and hardware departments are equally up-to-date in the class of goods stocked. An extensive business is carried on in the grocery department, and the firm's representatives daily travel the district for miles around, a daily delivery of goods being made by the firm's own vans to the numerous customers on the surrounding mines. Messrs. Ginsberg Bros. are direct importers, and carry on a large wholesale as well as retail business. This enterprising house has, in view of the rapid development of the various mines in the district, recently opened a timber yard, and erected on two of their stands in Benoni township, on the main road to Boksburg, large sheds and offices. A most complete stock of all lines of timber and building material is carried, together with paints, oils, ironmongery, and mining requisites.

GENERAL VIEW OF BETHAL.

Bethal.

The little township of Bethal, situated in the Standerton district, was laid out in 1879 by two Dutch farmers. The property was disposed of at a subsequent period to the Government of the South African Republic. Formerly there was a district of Bethal, but since the establishment of British rule both town and district have been incorporated in the Standerton district for revenue purposes. Bethal, which is about 36 miles from Standerton, received municipal rights in 1905. The town has hitherto been poorly represented as to its local interests, on account of dissensions among the three rival Dutch Church communities, who found it impossible to agree as to a member to represent Bethal in the late Volksraad. The railway extension of the Springs-Eastward line, completed to Breyten at the end of 1905, passes Bethal some two miles to the north-east, and will greatly assist the development of the district. The climate of Bethal is healthy, having fine frosts and bracing cold in winter, with cool nights in the summer. The soil is clayey, and not suitable for every kind of produce. Fruit does exceedingly well, large quantities of potatoes are grown, and mealies and forage are produced with great advantage. There are many stock farms in the district, principally devoted to sheep breeding, although many farmers also raise cattle. Water is not too plentiful, but can be found at a reasonable depth. A sound scheme of irrigation is among the urgent needs of the district. There are many churches in Bethal, all the Dutch denominations being represented. The centre of Church Square is occupied by the Dutch Reformed Church, a substantial stone edifice capable of accommodating 1,400 persons. There is also an Anglican Church. Much trouble has been taken in planting the town with trees, which have greatly improved its appearance. A Government Free School and a Dutch independent school exist, and both are well attended. There is a Sporting Club, and a recreation ground much in request for cricket, football, and polo. Up to the end of 1905 no branch of the Farmers' Association had as yet been established at Bethal. Commercially it is a good centre, and owing to the fact that many affluent farmers live in the district, and to the lately acquired railway facilities, it is likely to rapidly increase in importance.

Minister's Residence, Dutch Reformed Church, Bethal.

Mr. F. GOLDSHAGG.

Mr. Frederick Goldshagg, who is a member of the Bethal School Committee, was elected to the Municipal Council in 1904. He is of German nationality, and has had wide experience in South Africa, where he first landed in 1882. In 1885 he joined the Natal Mounted Police, and after two years' service repaired to the Barberton Goldfields, then the centre of attraction. There he remained also two years, afterwards making his way to Johannesburg. In 1891 he settled at Bethal, establishing himself in business as a coach and wagon builder. During the war Mr. Goldshagg lost everything

he possessed, but by hard work and sheer determination he has again built up a good connection, and is able to take a leading part in local politics. He evinces great interest in the mineral development of the district, which is known to contain excellent coal. This industry is so far in an undeveloped stage.

Mr. G. L. HUTCHINSON.

Mr. George Louis Hutchinson, law agent and auctioneer, was Chairman of the first Municipal Council of Bethal. On subsequent occasions he declined the honour of sitting on the Council. He has been approached with a view to representing Bethal on the new Legislative Council, being a substantial property-owner in the town. He was born in the Cape Colony, was educated at the Normal College, Capetown, and in 1897 commenced to practise his profession as law agent, entering into partnership with Mr. Bosman, of Standerton. In 1902 he settled at Bethal, practising there on his own account, and adding an auctioneering branch. Like many others, he suffered considerable losses during the war, and had practically to start life afresh. It is therefore a proof of his perseverance that he stands to-day in so sound a position as to be called upon to assume the responsibility of first Chairman of the new Council. He owns several of the best buildings in Bethal, numbering among his tenants the local branches of the Standard and National Banks.

Mr. J. VERMOOTEN.

One of the members of the new Municipal Council which was granted to Bethal in 1904 is Mr. Jasper Vermooten, a gentleman of Dutch nationality, who came from the Cape Colony and took up his abode in the Transvaal in 1883. Mr. Vermooten was for a number of years in the Civil Service of the South African Republic, and after the war, in 1902, he was employed for some months in the work of repatriation organised by the British, where his knowledge of the people and country were of great service to the department. On leaving this employment he settled in Bethal and started business there as a land, commission, and general agent and auctioneer. Mr. Vermooten has retained his seat on the Council since his first election, and is looked upon as a prominent townsman.

MUNICIPAL COUNCIL, BETHAL.

HUTCHINSON'S BUILDINGS, BETHAL.

Blauwbank.

Blauwbank was originally the name of a farm owned by Mr. James Jennings, situated 18 miles north-west of Krugersdorp. It now signifies a country district. It was on this farm that some of the first alluvial gold in the Transvaal was discovered, this find being worked over 30 years ago. There are large slate deposits on the farm, and a quarry in connection with this industry is working. On the adjoining farm large deposits of excellent stone, suitable for building purposes, are found in great abundance.

Both these deposits are of a valuable nature, and Blauwbank should become better known upon the completion of the Krugersdorp-Zeerust railway, now in course of construction, which will pass through the property.

THE ORIENT MAGALIESBERG TOBACCO COMPANY.

The Magaliesberg cut tobacco industry was started some 30 years ago by Messrs. J. & J. Jennings at Blauwbank, and they were closely followed by Mr. F. H. Hartley at Vaalbank, the adjoining farm. Both farms are situated on the southern slopes of the Magaliesberg Mountains. In 1891 Messrs. J. & J. Jennings' tobacco business was taken over by Mr. Frederick Beer, and carried on by him under the style of the "Orient Magaliesberg Tobacco Company" on the same premises. Some years later the factory was removed to the farm Steenekopjes, and a mill worked by turbine power erected. The factory, which is quite up-to-date in its equipment, is fitted with two Legg machines, one of 13½ inch cut and the other of 9 inch. These machines are capable of cutting up to 20,000 lbs. of pipe tobacco per day. In the earlier development of the business the tobacco was first made up into rolls or twist, from which it was cut into pipe tobacco by small 6 oz. machines. The demand at first was so limited that 30,000 lbs. was considered quite the average season's output. The tobacco is now manufactured direct from the leaf. The 1905 output by the Orient Magaliesberg Tobacco Company alone was more than a quarter million pounds weight. This firm have earned a world-wide reputation, as the figures of their output prove. It may here be mentioned that special means of preparation are adopted. Their well-known Magaliesberg tobacco is cured in the open, purely by the sun's influence. When sufficiently cured further fermentation is checked by the same process. It is tobacco pure and simple, totally unadulterated, consequently it possesses a minimum amount of nicotine and is less harmful to smoke than any other class of pipe tobacco. The tobacco, after the process of manufacture, is stacked in large heaps, and is so allowed to mature before being packed for sale. This natural process ensures good burning qualities and the development of its own distinct aroma. The tobacco is then put up in sealed packets weighing ¼, ½, 1 and 5 lbs. respectively, and thus finds its way not only all over South Africa, but to England and the Continent, to Australia, and other British Colonies. Mr. Beer, who is a native of Devonshire, England, came first to South Africa in 1862. He has further commercial interests in a general store and hotel. The former carries the usual stock of a country business, and the hotel is very ably managed, and is greatly appreciated by the travelling public. The great application and research which Mr. Beer has devoted to his special industry has added considerably to the importance and general popularity of the Boer tobacco.

F. BEER & CO.'S HOTEL, BLAUWBANK.

BLAUWBANK.

THE ORIENT MAGALIESBERG TOBACCO COMPANY.

View of Mill. Another view of Mill. Tobacco Store Room. Packing Room. Cutting Room.

Blindefontein

(NYLSTROOM DISTRICT).

MESSRS. E. J. MULLINS & CO.

The cultivation of sub-tropical produce is likely to bulk large in the future of the Transvaal, many districts being eminently suited, in soil and climate, to cotton, sugar, rubber, and tobacco plantations. Tobacco has been grown by Boer farmers of the Transvaal for years past, but it has been so roughly produced, and with so little knowledge of how to improve and refine the leaf, that it was never likely in such hands to become an article of important commercial value. It is satisfactory to find that tobacco cultivation has now been taken up by enterprising planters in those parts of the country suited to the industry. In this connection may be specially mentioned the firm of Messrs. E. J. Mullins & Co., of Blindefontein, in the Waterberg district. Wide experience and a knowledge of the soundest and most modern principles of culture and treatment have been applied. The property is in extent about 25,000 acres, and the soil is well suited to tobacco culture. Irrigation, the chief concern, received immediate attention on the plantation being commenced, and although the firm only started operations in 1905, already eight wells have been sunk, one artesian well is being sunk, and three

Tobacco Trees in Drying-shed.

dams are practically completed. The average rainfall in the district would be sufficient to rear a good crop, could it be relied upon. It is, however, uncertain. It is difficult to estimate the probable returns from the estate under notice. Fifty acres, as an experiment at the start in 1905, should give an approximate idea of what will be realised. The value of the crops naturally depends on good labour, good seasons, and good irrigation. An average of five plants to the pound of dried and fermented tobacco is allowed, but at times $2\frac{1}{2}$ or even $1\frac{1}{2}$ plants may give that result. The plants, placed 2 ft. by 3 ft. apart, should number about 7,000 to the acre. It is the weight and elasticity of the leaf that decide results. Mr. E. J. Mullins, the head of the firm, has been connected with the tobacco industry since 1887, in Sumatra, in the East Indies, where he worked on several well-known plantations, and was a planter himself for over ten years. He has expert knowledge of the raising of the tobacco plant from seed, the latest and best methods for improving the culture, and the drying, sorting, and fermenting of the leaf. Mr. Mullins considers, with many others whose knowledge is of account, that with proper treatment there is a great future for Transvaal tobacco, that it may become a valuable article of export, and that cigar and cigarette factories, conducted on up-to-date methods, should prove a successful venture in the Colony. The

apathy and conservatism of country districts tend much towards making work in these directions difficult and disheartening. For proper fermentation methods, tobacco should be grown on a large scale; and this necessarily decreases the cost of production and the commensurate outlay on dams and reservoirs, drying and fermenting sheds, and other requirements. The firm under notice have erected a large drying shed, 150 ft. in length by 21 ft. in height, and sloping to 9 ft. at the sides. This is able to accommodate some 75,000 plants. Huts for native labourers have been erected, and a planting machine and baling apparatus, with other tools and implements, were on hand early in 1906, showing that Mr. Mullins had lost no time in making adequate equipment. Later, cigar and cigarette factories will be started, the object being to obtain for Transvaal tobacco products a footing in the European markets. Mr. Mullins carried out successful experiments in rubber planting and production while in Sumatra, the fibre from certain plants which grow wild in those regions being highly commended by the Curator of the Imperial Institute, and by merchants of Mark Lane, London, E.C. These will be given attention by Mr. Mullins on the Blindefontein estate and in other parts of the Waterberg district, said to be admirably adapted to the culture of rubber-producing plants. At the time of writing, the crop on the Blindefontein estate was just being harvested. The leaf was of fine quality, elastic, with

Plucked Leaves in Drying-shed.

stems not too thick, and of a kind very suitable for cigar wrappers. The tobacco in the drying sheds was turning into very fine light and light brown colours; the size of the leaf was also very good, and will be mostly Nos. 1, 2, and 3 lengths, as shipped from Sumatra. The tobacco burns satisfactorily, and has a sound white ash and a pleasant flavour and aroma. Three-quarters of the crop was still unharvested, and had yet to be dried, fermented, and sorted.

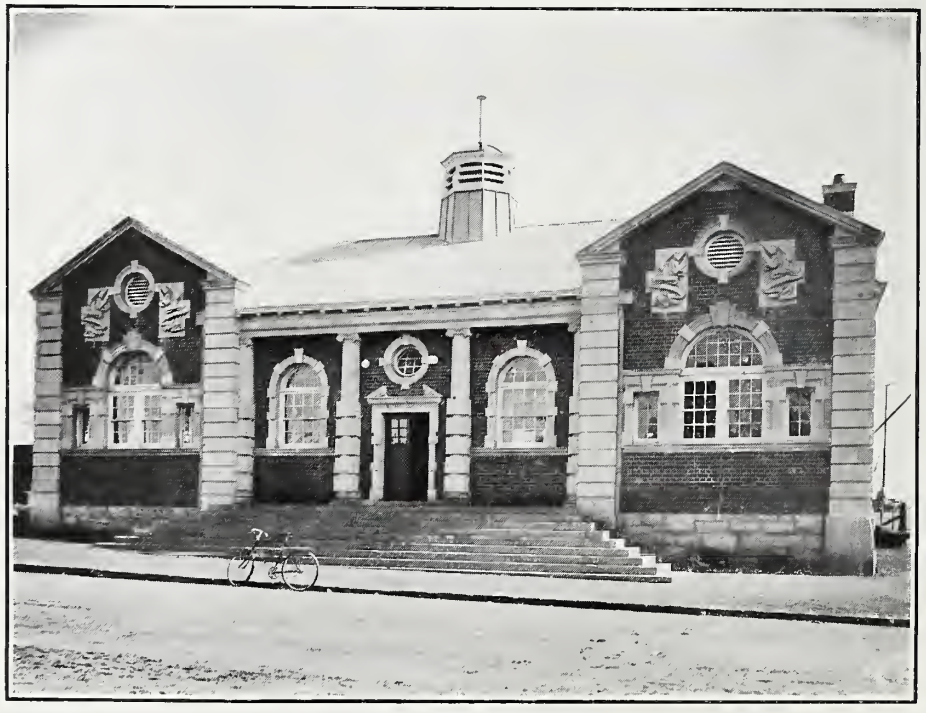
Boksburg.

Boksburg, an important mining, business, and pleasure centre 15 miles east of Johannesburg, is one of the oldest towns along the Witwatersrand. The first sale of stands took place on the 22nd August, 1887, the upset price being £10 a stand. Many of the stands purchased at that figure are still held by the original purchasers. Such stands in the leading thoroughfare—Commissioner-street—are valued by the municipality at as much as £2,500, and the value is undoubtedly still increasing. Boksburg was created a municipality under the Municipal Corporations Ordinance of 1903, and its first Mayor, Mr. B. Owen Jones, was elected by the Town Council on the 1st of December, 1903.

The Drying-shed. **A field of Tobacco on Mullins & Co.'s Estate.** **The Homestead of Mullins & Co.'s Plantation.** **Picking the Tobacco Leaf for taking into the Drying-sheds.**

COMMISSIONER-STREET, BOKSBURG.

thus being the first Mayor to be elected in the whole of the Colony. The municipality extends over an area of 38 square miles, in which there are five railway stations—denominated Half Way, Angelo, East Rand, Vogelfontein (the latter being the nearest station to the celebrated Boksburg Lake), and Boksburg. The principal mining property within the municipality is the East Rand Proprietary Mines, Ltd., while other mines are the Witwatersrand Deep, Ltd., Ginsberg, Driefontein Deep, Balmoral, Anglo Deep, Cinderella Deep, Boksburg Gold Mines, and East Rand Extension. The whole of the ground surrounding the township area is held under claim license, and is of proved value. The Cinderella Deep, Ltd., lately struck the reef at a depth of 4,060 ft., the assay value of which over a width of 6 ft. is more than an ounce to the ton. At the time of writing six new shafts are in course of sinking, including that of the Hercules Company, Ltd., which is to be of seven compartments, and therefore the largest in the Colony. The town of Boksburg is famous as a pleasure resort, and at a regatta held



Post and Telegraph Offices.

The Market House, Market Square.

on the Lake in January, 1905, there were at least 12,000 people present. The Lake is about to be vested in the Town Council by the Government, and the Council has under consideration the carrying out of an elaborate scheme to enhance the attractions of the place. It is proposed to construct a band stand, pavilion, refreshment rooms, and provide jetties and boats; also to widen the promenade in order to allow of the construction of a carriage drive entirely round the Lake. A good idea of the beauties of Boksburg can be gathered from the accompanying photograph, although it fails to convey the varied hues of the trees ranging from the light green verdure of the weeping willow to the darkened shades of oaks and firs. At the eastern end of the lake are several islands connected with the promenades by rustic bridges. An excellent train service is provided from Johannesburg—some twelve trains running each way daily. The municipality is divided into five wards, returning three members each. The mining area north and west of Boks-

A glimpse of the Lake at Boksburg: a favourite Picnic Resort of Johannesburgers.

General View of the Lake.

burg has three wards, and therefore nine representatives, as against six for the town. The Town Council is about to apply for authority to raise a loan of about £100,000, which will be spent on road construction, water distribution, septic tank system, Lake improvements, and fire brigade equipment, &c. A considerable amount of tree planting has been done in many of the streets in the town, which is an extremely healthy one, and several people reside there whose place of business is in Johannesburg. Boksburg must be given credit for its successful crusade against the invasion of the Asiatic trader, which culminated in the great National Convention held in Pretoria in 1904. Every town in the Colony was represented by each of its public bodies, and the Convention almost unanimously passed a vote insisting that Asiatics should be relegated to bazaars for trading and residential purposes. Hence, Boksburg is known as "White Boksburg," and to-day no Asiatic has any place of business in the town. Excellent accommodation is provided at the hotels, which include the Grand and Kilfoils, both houses that can be recommended. The population of the whole municipal

Members of the Town Council, 1906.

area, white and coloured, is estimated at 20,000. The Government is about to erect a school near Vogelfontein station, and when completed this will be one of the largest along the Witwatersrand, sufficient to serve the needs of the whole of the East Rand. The third largest hospital in the Colony is at Vogelfontein, and is built upon a site overlooking the Lake. This was opened by His Excellency the High Commissioner and Governor, the Earl of Selborne, on the 19th August, 1905. He also opened the public library in Boksburg on the same date.

The Mayor of Boksburg

Mr. Geo. Constable is a native of Cheltenham, England, and his reasons for leaving his home for South Africa, in 1895, were principally connected with his health. He is a printer, publisher, manufacturing stationer, and account book maker, and has been identified with the printing and allied trades throughout his career in South Africa. He took up his abode in Boksburg in 1896, after spending some time in the Orange River Colony (or the Free State, as it was then called), and in 1898 started the now well-known business of Geo. Constable & Co. He held office for some years as vice-Chairman of the Chamber of Commerce, a body that, apart from commercial matters, did excellent work for the town prior to the granting of municipal powers. In 1902 Mr.

Premises of G. Constable & Co., Germiston.

Constable was elected to represent Ward 2, for two years, in the first Municipal Council of his town. During this time he served as Chairman of the General Purposes Committee, and at the end of his period of office was re-elected unopposed for a term of three years. He was then honoured by being elected Mayor for the year

Business Premises and Printing Works of Constable & Co., Boksburg.

ending November, 1906. His love for and devotion to the town of his adoption is typical of the spirit which animates many of the public men of this thriving and promising centre, and he is ever diligent to promote Boksburg's highest and best interests.

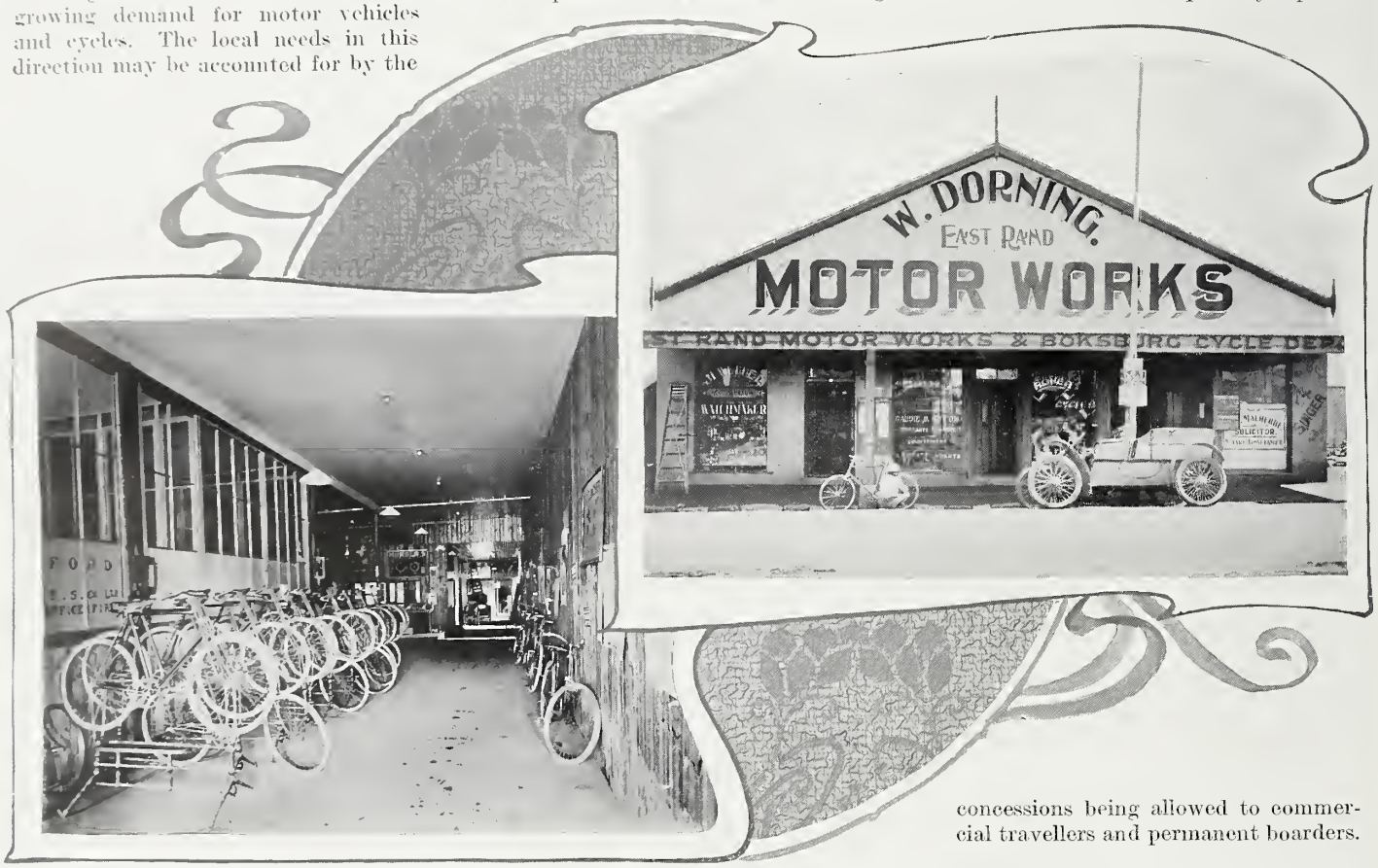
Messrs. Geo. Constable & Co.

The firm of Messrs. Geo. Constable & Co., printers, publishers, and manufacturing stationers, of Boksburg and Germiston, has been in existence since 1898—a most inauspicious year in which to start a new venture, inasmuch as on the outbreak of war in the following year the young business was forced, like many others, to close down. The firm re-opened their premises in August, 1901, and it is therefore only since the termination of hostilities that the business embarked on the career of prosperity which now gives it a foremost place on the East Rand. Messrs. Constable & Co. in 1902 established a branch of their business at Germiston to cope with the rapidly-increasing business from that important centre, and the two branches together now employ upwards of fifty hands. In addition to their other operations the firm are proprietors of the *East Rand Express*, which makes its appearance twice weekly, on Wednesdays and Saturdays. This journal after a year's competition absorbed the *Boksburg Herald*, established in 1895, and is now the only paper published in the municipalities of Germiston, Boksburg, and Springs—an area containing a quickly-increasing population at present estimated at 100,000. The *Express* is a recognised official medium for the notices of the public bodies mentioned, and, being printed in book form with advertisement and news pages alternating, is a very popular medium for the announcements of the commercial community. The paper is devoted almost entirely to local politics, and to the interests and incidents of the East Rand district. It is smartly written and well printed, and enjoys the reputation of being a sound, reliable journal. The temporary premises of Messrs. Constable & Co. at Boksburg are situated on the Market Square, and printing plants are at work both there and at the Germiston branch. With regard to the *personnel* of the firm, the founder, Mr. George Constable, is at the time of writing the Mayor of Boksburg, and a brief account of him appears on this page, and a group illustration of the Mayor and Councillors of Boksburg on page 374. The other partner of the firm, Mr. J. J.

McMenamin, has had a long association with newspaper work, and has been connected with Mr. Constable on the East Rand since 1896. He represented the London *Daily Mail* and the *Natal Witness* at the front during the war, and in 1901 joined Mr. Constable in the present business. Mr. McMenamin is manager of the *East Rand Express*, and controls the firm's Germiston branch.

Mr. W. DORNING.

The size and importance of the East Rand Motor Works and Boksburg Cycle Depôt, controlled by Mr. W. Dorning, indicate an extensive and growing demand for motor vehicles and cycles. The local needs in this direction may be accounted for by the fact that many of the employés of the surrounding mines require, in the exigencies of their occupation, to travel long distances in going their rounds; and also that cycle and motor—popular means of locomotion on the Rand—have come to stay. The emporium under notice is by no means the only business of the kind in Boksburg. Mr. Dorning, however, appears to have built up a considerable concern. There are in his stocks no fewer than 15 of the best makes of cycles, including the Rudge-Whitworth, Triumph, Alldays, Swifts, Rover, Raleigh, Columbia, Singer, and others. The extent of Mr. Dorning's business operations may be gauged from the accompanying illustrations, and it is necessary to remember that the motor bicycle and the motor car are now forming an important branch of the firm's operations. In motor cycles the makes which are kept on hand include the Minerva, the Werner, and the "F.N." Mr. Dorning is himself a cyclist of some reputation, and achieved many records on the old-fashioned "ordinary" both in South Africa and in England in the early days. He was the recipient of numerous trophies and medals. Mr. Dorning hails from Lancashire, and arrived in South Africa in 1882. In addition to his Boksburg business there are branches in other townships on the East Rand—viz., Benoni, Springs, and Comet. Mr. Dorning's Boksburg depôt keeps a number of skilled workmen employed.



Business Premises of W. Dorning, Boksburg. Interior of W. Dorning's East Rand Motor Works and Cycle Depôt, Boksburg.

THE GRAND HOTEL, BOKSBURG, LTD.

The Grand Hotel, Boksburg, Limited, is controlled under the joint management of two of the directors. The hotel was officially opened with a dinner on the 1st August, 1905, at which Mr. B. O. Jones, Mayor of the township, presided. It is pleasantly situated facing the Market Square, and quite close to Boksburg lake. The house is substantially built, and contains 20 bedrooms, a dining hall capable of accommodating 150 persons, and a billiard room fitted with a table by Burroughes & Watts. The furniture, which was imported specially for the establishment, is tasteful in design. A lounge on the first floor leads on to a verandah. At the rear of the main building is stabling for eight horses. The tariff is 12s. 6d. per day, special concessions being allowed to commercial travellers and permanent boarders.

Messrs. HARDIE & SYMINGTON.

Messrs. Hardie & Symington, ironmongers and tool merchants, who have an important branch of their business in Germiston, commenced operations in Boksburg in 1898. In both of their establishments the same style of business is carried on. The Boksburg depôt is under the management of Mr. Symington, while Mr. Hardie has charge at Germiston. The firm's premises in Boksburg were found to be too small for the operations of the business, and in the latter end of 1905 a new building was projected there. This is intended to be a two-storey structure on the firm's own stand adjacent to the Post

Office. Messrs. Hardie & Symington are direct importers, and use both Delagoa Bay and Durban as ports of entry. The English buying agents of the firm are Messrs. Keep Bros., of Birmingham. The firm is a member of the Chamber of Commerce in both Boksburg and Germiston. Mr. Symington was Chairman of the Boksburg Chamber of Commerce in 1904. The firm has the sole agency for Forrest's "Model" Stoves for the East Rand. It is noteworthy that the stoves and tools kept in the firm's stocks are largely of American manufacture. Mr. Hardie and his partner are both natives of Edinburgh. The former has been in South Africa some 12 years; Mr. Symington has been seven years in the country. Mr. Symington is a lieutenant in the Scottish Horse Volunteer corps.

THE GRAND HOTEL, BOKSBURG.
Dining-room. The Billiard Room. The Lounge.

Mr. B. OWEN JONES, J.P.

One of the most respected citizens and old residents of Boksburg is Mr. Benjamin Owen Jones, who occupied the civic chair of the township for two years during 1903-5. Mr. Jones is a native of Llanidloes, Montgomeryshire, North Wales. He arrived in the Transvaal in 1888, and a year later settled in Boksburg, where he opened a chemist's establishment. He identified himself with the public life of the growing East Rand township, and was instrumental in inaugurating the Boksburg Chamber of Commerce, which was started in 1895. He was Chairman of the Chamber for eight years. At the first municipal elections Mr. Jones was returned at the head of the poll for Ward No. 2. Owing to the mayoral elections of 1903 taking place in Boksburg a day earlier than in other towns, Mr. Jones in his appointment to the chairmanship of the Municipal Council of the township may be said to have had the honour of being the first Mayor to be elected in the Transvaal. He was again appointed to the chair in 1904. The town's lighting scheme was carried out by the Municipal Council during Mr. Jones's term of office. The subject of this notice is head of the flourishing firm of B. Owen Jones, Ltd. The business founded by Mr. Jones was floated as an English company in 1898, the head offices being transferred to Boksburg in 1905, when the Company was registered in the Transvaal. The business premises are situated in Market Square. The Company has nine branch establishments—one with premises in Commissioner-street, Boksburg, one in Standerton, and seven others on the various mine properties on the East Rand. The business of the Company, in addition to that of ordinary chemists and druggists, comprises the supply of assay and cyanide material and mining chemicals,

Mr. Owen Jones, first Mayor of Boksburg.

KILFOIL'S HOTEL, BOKSBURG.

The Billiard-room. The Bar.

An attractive Dining-room. Another view of the Dining-room.

which is an important branch of its operations. Surgical appliances, proprietary medicines, toilet requisites, etc., are also stocked. Mr. Jones is a Government nominee member of the Pharmacy Board, and is the Examiner of Pharmacy for those who desire to be qualified and registered as chemists and druggists in the Transvaal Colony. He is also appointed as a member of the Advisory Board of the District Hospital recently established.

KILFOIL'S HOTEL.

The year 1905 saw what may be described as something of a boom in hotel-building in Boksburg. Among others erected at that period was Kilfoil's Hotel, which was opened for business in July, 1905. This establishment can be recommended with confidence. Its situation is adjacent to the principal business houses at the corner of Commissioner-street and Smit-street, within two minutes' walk of the Market Square. The terms are reasonable, the tariff being fixed at 10s. 6d. to 12s. 6d. per day. The accommodation offered is all that can

Interior of Norton & Co.'s Premises at Boksburg.

be desired, and the *cuisine* and the liquors kept are of the best. The building, which occupies the greater portion of four stands, is the property of Mrs. Kilfoil, who is also the lessee of the hotel. A prominent feature of the building is a spacious and well-appointed dining hall to seat 150 persons. The billiard room is fitted with two tables by Burroughes & Watts, and its appointments remind one more of a club room than an apartment of a provincial hotel. There are 17 bedrooms on the first floor, a ladies' drawing room, and a smoking room replete with comfortable surroundings. Mrs. Kilfoil owns considerable property in Boksburg. Under her personal supervision the hotel which bears her name should become popular and successful. Travellers can secure sample rooms at this establishment. A conveyance runs from Kilfoil's Hotel to meet all trains at Vogelsfontein station. Pleasure boats are kept on the lake for the use of boarders. Tariff for boarders at Kilfoil's runs from £10 per month (to share room) to £12 (single board). The hotel is fitted throughout with electric light, and bath rooms with hot and cold water and "shower" are provided for ladies and gentlemen.

Business Premises of Norton & Co., Boksburg.

Messrs. NORTON & CO.

Among the prominent businesses of Boksburg is that of Messrs. Norton & Co., direct importers of tools, household ironmongery, builders' requisites, and general hardware. The members of the firm are Messrs. Thos. I. Norton, P. A. Brink, and A. MacDowall. Mr. Norton, a Rand pioneer, resides on his beautiful estate, "Glen Norton," in Elsburg, in addition to which he owns several other valuable properties. Messrs. Brink and MacDowall were for a long time connected with the Standard Bank. Mr. MacDowall is a member of the Society of Accountants of the Transvaal. He is the President of the Boksburg Chamber of Commerce, which has done good work. The business was founded in 1903, and operations are carried on in a spacious three-storey warehouse and retail store, 200 ft. by 50 ft., facing Commissioner-street, and running through to Market-street. The firm built and own their premises. The style of architecture is modified Flemish, and is pleasing in effect. The building is an important addition to the many fine structures recently erected, and shows the firm's confidence in the local trade prospects.

Messrs. F. OSBORNE and CO.

One of the largest and oldest-established stores in Boksburg is that of Messrs. F. Osborne and Co., general merchants. The premises, covering a large area of ground, are situated at the corner of Commissioner-street and Market Square. The stock comprises merchandise of all descriptions, contained in separate departments. The firm has the reputation of doing considerable business.

Messrs. RIGG & HULL.

Mr. R. S. Rigg and Mr. T. D. R. Hull, of the Standard Buildings, Boksburg, and at Benoni, are members of a firm representing the legal profession in the above two townships. Mr. Rigg is an Englishman, and was enrolled as a solicitor in 1898. He arrived in South Africa in 1901, and was for a time employed in the legal house of Messrs. Van Hulsteyn, Feltham & Fry, prior to starting practice on his own account in 1904 at Boksburg. Mr. Hull assumed partnership in this firm in October, 1905. He was admitted to his profession in the Cape Colony, and is also a convey-

Mr. R. S. Rigg, Boksburg.

ancer and notary public. The practice of Messrs. Rigg & Hull has assumed large and growing proportions.

Breyten.

Situated in the most desirable part of the pleasant and fertile district of Ermelo, the little dorp of Breyten, now struggling into existence, would seem to have a bright and prosperous future in store. The Springs-Eastward extension of the railway was connected as far as Breyten on December 29th, 1905. Not only is the neighbourhood famous for the richness of its soil and an excellent climate, but Breyten itself is placed right on the new railway extension, and it is confidently expected that when the line continues its destined way through Swaziland, this point will be selected for the junction, as it is the nearest and most convenient spot for that purpose. This would give an immense lift to the little township, and would justify the foresight of those who have been eagerly investing in landed property ever since the railway extension was projected. From Breyten, even now, it is possible to book by rail to all towns in the Transvaal, or indeed in South Africa, and eager inquiries are being made concerning freight, rates, etc., by those impatient to make use of the newer and more convenient means of transport. Breyten is the property of one Mr. N. J. Breytenbach, reference to whose enterprising career will be found below. The laying-out of his little township was only completed in the last month of 1905; but stands were hurriedly bought up, and within a month there had sprung up two hotels, several stores, and post and telegraph offices, in addition to the railway station; and many plans for other buildings are being made out and passed as this is written. The township lies in a conveniently central position for the carrying trade into Swaziland, and indeed for the whole of the eastern districts of the Transvaal. The town lands include 500 erven, varying from 75 ft. by 50 ft. to 150 ft. by 150 ft. A commonage of 600 morgen has been granted by the founder of Breyten for the erection of churches and schools, and 10 erven have been handed over to the Government for public requirements. A market square, two parks, and a recreation ground have been also arranged for. Three permanent springs intersect the town lands, and these have been reserved for public use. There is also a plentiful water supply, to be obtained at an easy depth by boring. A thoroughly good supply for railway purposes can be procured at a depth of 80 ft. The climate, like that of the entire Ermelo district, is admirably healthy, and free from stock, malarial, or epidemic diseases. The soil is rich enough to rear every kind of produce, and is considered to be specially adapted to market gardening, which should be a soundly profitable occupation. Fifty acres of plantation are dispersed about the different parts of the township, and pines, wattles, gums, and cypresses all flourish exceedingly with little trouble. Both coal and oil deposits exist in the neighbourhood of Breyten, the former in great quantities, and should prove a valuable source of wealth in the future. Asbestos has been discovered not far distant, and so far as is known at present this is of good quality, and likely to pay well. There can be no doubt that a neighbourhood so richly endowed by nature is an ideal spot on which to establish a township, and with the progressive traditions of the Ermelo district Breyten should have a prosperous future awaiting it.

Mr. N. J. BREYTENBACH.

Mr. Nicholas Jacobus Breytenbach, owner of the farm on which the little town of Breyten—named after its founder—is situated, is the grandson of Conrad von Breitenbach, a former Governor of the Cape Colony. The name has been altered to the Dutch form, but it still retains enough of its old style to recall historical associations and to carry us back to very early days indeed. Born in Lydenburg in 1847, son of one of the sturdy *voortrekkers* who pioneered and opened up these fertile provinces, Mr. Breytenbach recollects the stirring days when hunting was not only sport, but the chief business of the time. The veld teemed with live stock of innumerable varieties, and those who to-day weary of its monotony would be amazed to know or indeed could form little conception of the vast hordes which roamed upon it, and which devastated the holdings of the early settlers. When merely a lad, Mr. Breytenbach explored the Komatie Valley with his father, and they settled in its vicinity until 1864. They then parted com-

Mr. N. J. Breytenbach, Breyten.

pany, and the younger man migrated with his family to the part of the Ermelo district where he now resides. There he bought a farm, and settled down. He was duly appointed a field cornet for the Ermelo district under the late Government, although at this time he also possessed far larger interests in Swaziland. Mr. Breytenbach is a very large holder of property, and in his farming operations he employs the most up-to-date methods. He and his sons, of whom there are five, hold an estate of some 12,000 acres, each cultivating his own portion. Fruit grows abundantly, especially deciduous kinds, the altitude being 6,300 ft., and the country well suited for its cultivation, and well watered. Sheep farming is most profitable. The stock at the time of writing consisted of 3,500 merino sheep, 300 head of Afrikander cattle,

Homestead of Mr. N. J. Breytenbach, Breyten.
Mr. Breytenbach's Turnout.

A side view of Homestead.
Coal taken from Mine on Mr. Breytenbach's Estate.

and some Jerseys for dairy purposes, with 50 horses of the well-known Basuto pony type, and a number of mules. Mr. Breytenbach had to make a fresh start in his stock-breeding industry after the war. His previous year's yield of wool averaged 7 lbs. per fleece, which, however, is being steadily improved, and sixteen thousand bags of mealies were produced from his farm this season. A steam mill, a threshing machine, and many modern farming implements are in use. Sheep have to be driven down to the Low Veld in Swaziland during the winter, as the High Veld yields no pasturage, and the process of feeding the stock would be most difficult and costly. Coal is found all over Mr. Breytenbach's estate, and a mine is being worked by hand, the mineral being very near the surface. The seam is 12 ft. wide, and its assay value, as declared by the African Banking Corporation, should ensure, in the event of it being properly worked, a very profitable return. Mr. Breytenbach is a Justice of the Peace for the district, and is greatly interested in its development and in that of the little town of Breyten which he founded. He has a profound belief in the future of Swaziland, owing to its fine soil and richness in every kind of mineral. Mr. Breytenbach was a member of the committee appointed to reorganise the government of Swaziland in the time of the Swazi King Umbandine.

Carolina.

In 1883 some of the farmers in the eastern portion of the Transvaal laid out the little settlement of Carolina as a private township. They named it after Mrs. Carolina Coetzee, wife of a *voortrekker* who was one of the original owners of the property. In 1887 it was proclaimed a township by the Government, and in 1894 became a sub-district of Ermelo. The town was created a Municipality in 1904. The population consists of 300 white and 100 native residents. The town is assessed at a value of £97,985. The area includes 2,249 morgen, with a commonage of 4,760 acres. It is well

supplied with water, there being three springs which have a continuous flow, and have never been known to run low. Carolina has two schools, one a Government institution, the other independent Dutch; both are well attended. A town hall has been rented from a private syndicate for general purposes, and six morgen of ground have been leased to the Agricultural Society on which to hold an annual show. All kinds of stalls and fixtures have been erected on this ground, and many trees planted, and the show has been most successful for two years following. The Council have contracted for the planting of 1,000 gum, pine, and cypress trees. This has resulted in the laying out of a park, and in planting avennes alongside the sluits, with excellent effect. The altitude of Carolina is 5,660 ft. above sea level, and the climate of the place is exceptionally healthy. It is an excellent district for stock-raising and agriculture, and is also rich in iron, copper, mica, tin, sulphur, asbestos, and other base metals: gold, too, is known to exist. The mineral properties are mostly taken up by the large firms on the Rand, who hold them under option, but cannot develop them until a satisfactory railway service opens up the country. The asbestos has been taken up by a London firm which is now trying to work it; but progress in this venture is also hindered for the same reason, and until the railway runs to within convenient distance development must be inevitably retarded. Coal is found largely all over the Carolina district, excellent for steam, household, and smithy purposes, and hydraulic lime is also present, of very fine quality. All these natural riches await development and railways. About 35 miles from the town of Carolina are situated mineral springs or warm baths, which belong to the Government. These springs issue from under the rock with a strong flow, and the bath or pool is of natural formation, 12 ft. by 50 ft. in dimension. The water is of high temperature. A cold spring hard by is used to moderate the heat. Healing qualities are claimed for these springs, several cures being on record. The origin is volcanic, and in the neighbourhood is a mountain which gives forth occasional rumbling sounds. It is called by the Kafirs "Holm o' Holm," which signifies "Ho, now." There is a tradition among the natives that entrance to it can be gained, but that none come forth again who once enter, on account of the intricacy of the passages within. A Kafir who was once supposed to have gone through, and retailed his experiences, related that he saw lumps of yellow stone and dried seeds, and an exploring party of white men endeavoured to find the entrance and penetrate it. The party, however, in spite of the guidance of Kafirs, lost their way, and nothing came of the expedition. The district around the warm baths has some beautiful waterfalls.

Mr. JACOB CARDINAAL.

Carolina is fortunate in having her municipal affairs in the hands of men whose interests are centred in the prospects of the town, and whose public spirit puts the advancement and improvement of local industries in the foremost place. The first Chairman of the Municipal Council was Mr. Jacob Cardinaal, who assumed the position in 1903, and in 1905 was re-elected for another term of two years. By their action the voters proved that they recognised Mr. Cardinaal's efforts and desire to further the interests of the community in every manner possible. The Agricultural Society, which was established and held its first show in Carolina in 1898, included Mr. Cardinaal among its founders, and he is now its treasurer. He is chairman and secretary or treasurer of several other societies which make for public welfare and harmony, and his duties as a citizen are well and ably discharged. Mr. Cardinaal has made great efforts to secure an early connection with the Delagoa Railway line, the accomplishment of which would make a vast difference to the progress of the district. Mr. Cardinaal is one of the citizens who hope to see a revival of the conditions which prevailed before Carolina became incorporated as a sub-district of Ermelo. Previous to the war it was a separate and independent community. The subject of these notes, who is the founder of the Carolina Club, is a law agent by profession, and was born in Holland. He arrived in South Africa in 1882, and settled in Carolina in 1894.

Municipal Council, Carolina.

Messrs. GORDON & SMITH.

Mr. G. G. Gordon, a native of Victoria, Australia, who is a member of the Municipal Council of Carolina, was in the employ of the Repatriation Department just at the termination of the late war, and held a position at one of the department's depôts for 12 months. He is senior partner in the firm of Gordon & Smith, coachbuilders, and proprietors of a large milling business. The firm import all their material from Australia. This has proved a most satisfactory arrangement, and there can be little doubt that in the future a big industry in this direction will be opened up. The business was started in 1903 at Carolina, and it is intended that a branch should be opened on the same lines at

Breyten, on the railway extension. Mr. Gordon, who is Chairman of the Health Committee of the Municipal Council, does not find his duties very onerous, as the climate is a beautiful one, and the health of the neighbourhood excellent. He is exceedingly keen in advancing the interests of the Order of Good Templars, of which he is local "chief." All hopes of prosperity for this well-endowed little community practically depend on the speedy extension of the railway to this district. All the inhabitants of the town are doing their utmost to secure by this means the advantages that the district is entitled to by reason of its abundant resources.

Business Premises of S. Norris & Harvey, Carolina.

Mr. SAM NORRIS.

Mr. Sam Norris is one of the Town Councillors of Carolina who were elected in 1905. Besides serving the town in this capacity, he is a member of the Agricultural Society. Mr. Norris and his partner, Mr. Harvey, who carry on business as builders and contractors, are largely responsible for the rebuilding of many of the demolished farm homesteads and houses in the town, as well as the prominent buildings that have made their appearance since the war. There was great activity in the building trade immediately on the conclusion of peace, and this firm did an extensive business until most of the dwellings were re-built. When the many valuable mineral properties which exist in this neighbourhood are opened up, prosperity should once more reign. Mr. Norris came to South Africa with the Royal Engineers, being called off the Reserves, in 1899. At the conclusion of the war he obtained employment from the military authorities at Standerton, in putting up houses and public buildings, in which work he was associated with others. He then settled in Carolina, having formed a high idea of its possibilities. Messrs. Harvey & Norris have their own brick-making ground, and are in every way a progressive firm.

Mr. E. E. PEARCE.

Mr. Ernest Edward Pearce, who is Chairman of the Chamber of Commerce at Carolina, and member of the Municipal Council, is another useful and public-spirited citizen of the type that desires to advance public and local interests, as well as his own private business. Mr. Pearce has large dealings in wool with the local farmers, and naturally desires to see this industry conducted upon the most up-to-date principles. He is a member of the Agricultural Society, and constantly encourages the local sheep farmers to endeavour as much as possible to improve the quality of their wool and to rear merinos. On the termination of the war, when the farming population were struggling to regain their footing, Mr. Pearce strongly urged the desirability of the farmers raising loans upon their properties in order to more speedily conduct their operations. This was much against the principles and practice of the people; yet those who took this advice have not had reason to regret it, and many of them are now in a position of independence. Mr. Pearce is colonial born, and hails from Cape Colony. He takes an interest in sport of every description, and is president of the local Tennis Club, a very flourishing concern. He has lived in Carolina since 1891, and has watched its expansion with interest since it was a tiny village with only two stores. Mr. Pearce has profound knowledge and understanding of the natives, having lived and traded among them for many years. In South Africa, where the white population is constantly brought into close contact with the native, such knowledge is of the most material importance.

Gordon & Smith's Wagon Works, Carolina. The Coach seen in the illustration is ready for the journey to Swaziland, distant 100 miles.

Mr. F. H. RYLEY.

An energetic member of the Municipal Council of Carolina is Mr. Frank Heath Ryley, who, as the manager for Messrs. Parker, Wood & Co. in the town, is naturally deeply concerned in the welfare and prosperity of the centre, and anxious to help in every way the advancement of local interests. The business Mr. Ryley manages does a very extensive trade in building materials, so that in supplying the wherewithal to re-build homes and to make good the dilapidations of war, Mr. Ryley has played a prominent part in inducing the present advance upon prosperity which Carolina is undoubtedly making. There is a Chamber of Commerce at Carolina, of which he is a useful member, and he also takes a keen interest in the work of the local Agricultural Society. These two bodies are great factors in provincial life, and it is impossible to over-value the benefits derived from such co-operation. Mr. Ryley was elected a member on the formation of the Urban Board in 1903, the precursor of the present Municipal Council. Mr. Ryley started work with the firm in 1896 as assistant manager, and has been associated with them since his arrival in South Africa. He is a native of Shropshire, England, and has had his home in South Africa for the past 10 years.

Municipal Council, Christiana.

Christiana.

The town of Christiana, a centre of alluvial diamond diggings, is situated in the extreme south-west of the Transvaal, on the banks of the Vaal River. It derived its name from Christian Hattingh, the original owner of the farm where it stands. The diamond workings in this district were

A Public Welcome at Christiana.

CHRISTIANA.

Main Street in Christiana. Government Offices. The Vaal River. Diamond Workings. South African Constabulary Barracks.

the first to be exploited in the Transvaal, their discovery dating from 1872. The geological formation of the river diggings at Christiana is amygdaloidal diabase and other formations of the Ventersdorp geological series, covered with gravel (alluvial deposit) which varies from six inches to four feet in depth. Diamonds of fine quality have been found in all the river beds in the district. Some of them have been valued as high as £20 per carat. Stones up to 150 carats have been among those discovered. There were some 200 diggers at work at the commencement of 1906, and the monthly output averaged a value of upwards of £1,000. The industry is from the nature of things a precarious one, but the diamond-seekers make, on the whole, a fair living, with an occasional run of exceptional good luck. The town of Christiana is well planned, being laid out on an area of over 617 morgen. The town lands extend to 6,225 morgen. The rateable value of Christiana is £87,155. A greater part of the town property is irrigable land, and water furrows intersect the town in all directions. A rate of 1s. per month per irrigated erf is charged to holders. Some 477 erven are thus irrigated, the remainder being classed as "dry" erven. Christiana has Government offices, a large Government free school, and two churches, of the Dutch Reformed and the Anglican denominations. There are four leading stores, in addition to a number of smaller business houses. The town received municipal rights after the conclusion of peace in 1902. Mr. William McEvoy is Chairman of the Municipal Council.

Since the above was written, diamond-digging at Christiana has received a fresh impetus. The Mines Department having arrived at the delimitation of the Transvaal and Orange River Colony boundaries in the bed of the Vaal River, Government proclamation throwing open to diggers

QUEEN'S HOTEL, CHRISTIANA.

Premises of McEvoy & Co., Christiana. Boot Department, McEvoy & Co., Christiana.

an extent of about seven miles of the river bed was gazetted, and formally read out on the 1st June, 1906. The new field is situated opposite the town lands of Christiana. The Mines Department agreed to the following scale of rates for alluvial claims:—150 feet by 150 feet, £2 10s. per month; 90 feet by 90 feet, £1 per month; 90 feet by 45 feet, 10s. per month; 45 feet by 45 feet, 5s. per month. Pegging commenced immediately after the proclamation had been read, upwards of 100 applications for claims being registered. Numbers of people were attracted to Christiana during the early part of June, and by the middle of the month some hundreds of diggers were at work, reports of satisfactory finds being made.

Messrs. McEvoy & Co.

The members of the firm of McEvoy & Co., general merchants and direct importers, Christiana, are Mr. F. W. Baillie and Mr. William McEvoy, the latter being the managing partner. The business is conducted in extensive store premises in the main street of the

Dining-room of the Queen's Hotel, Christiana.

township, is of an extensive nature, and easily takes precedence of any other general business in the district. Messrs. McEvoy & Co. also control the Christiana Milling Company, a large and important enterprise. There are no other mills within a distance of 40 to 50 miles of Christiana, and the greater part of the wheat grown in the district naturally passes through the Company's mill. The business under review was established in February, 1904, and has since made very rapid strides. It now stands in the front rank among the commercial houses of the Christiana district. Messrs. McEvoy & Co., being direct importers, have always comprehensive and well-assorted stocks on hand. Both partners of the firm are interested in agriculture, and own property in the neighbourhood of their prosperous establishment.

Interior of I. H. Seeligsohn's Store, Christiana.

THE QUEEN'S HOTEL.

The Queen's, Christiana, opened in January, 1905, stands on the site of an older hotel which was burnt down on St. Patrick's Eve, 1904. The new house occupies a large frontage, and comprises the main building—in which are situated the spacious dining room and hall, a well-appointed billiard room and bar, and sitting and writing rooms—and a courtyard in the rear, containing 24 bedrooms, built of brick. The hotel is well furnished, comfortably appointed, well ventilated, and the sanitary arrangements are up to the standard of modern requirements. There is excellent stabling convenience. The *cuisine* is beyond question superior to that of most South African country town establishments; while judgment and discretion are displayed in the selection of liquors and cigars. The hotel is under the capable management of Mr. Howard H. Chettle, who supervises an efficient staff and personally attends to the comfort of visitors. There are special sample rooms for commercial travellers.

Premises of I. H. Seeligsohn & Co., Christiana.

MESSRS. I. H. SEELIGSOHN & CO.

The firm of Messrs. Seeligsohn & Co., general merchants, established in Christiana in 1889, is now one of the most successful business houses in the district. When founded the premises occupied only one stand, 20 ft. by 20 ft.; the store alone now takes up some 3,600 sq. ft., and the warehouses cover an extent of as much again. The stocks carried are varied and comprehensive. Special lines dealt in by this firm include agricultural machinery, building material, and every necessary for complete house furnishing. There are also large and well-equipped millinery and drapery departments. Messrs. Seeligsohn & Co.'s connection has practically trebled since the war, branch establishments are therefore to be opened in the district, in addition to those existing at Balmoral, near the Abbelekop gold mine, and at Pudimoe siding, on the Bechuanaland border. The spacious showrooms of the firm are a feature, and compare favourably with those of business houses in larger centres in the Transvaal. Messrs. I. H. & S. J. Seeligsohn were joined in 1901 by Mr. Max Hertz, as partner. Mr. Hertz, who is a native of Hamburg, Germany, has had 16 years' experience in South Africa, and possesses an intimate knowledge of the town of Christiana and the surrounding district. The Messrs. Seeligsohn were born in Cape Colony. The Central

The Central Hotel, Christiana.

Hotel, situated opposite the store, is the property of the brothers Seeligsohn. It is extensively patronised, and contains 16 bedrooms, a spacious dining room, a sample room for the use of commercial travellers, and a billiard room with two new tables. The hotel is conveniently situated in the main street, close to the principal places of business.

Messrs. SIM & McDONALD.

Messrs. Sim & McDonald, builders and contractors, of Klerksdorp and Christiana, who established their business in 1902, have carried out some important contracts for the Government in the district, as well as for the general public. Several schools and other Government buildings have been erected by the firm, the workmanship being of an eminently satisfactory description. Contracts for the building of stores and dwelling-houses have also been largely undertaken. Both members are sound, practical workmen, and understand their business thoroughly. Mr. Sim left Aberdeen for South Africa in 1892. Mr. James McDonald is a native of Inverness. Mr. McDonald spent upwards of 11 years in Australia before starting for South Africa. While at the Antipodes he erected several batteries and cyanide plants, and carried out numerous contracts in connection with the mining industry. Before entering into his present partnership he had done considerable work in erecting railway stations, goods sheds, and undertakings of a similar description.

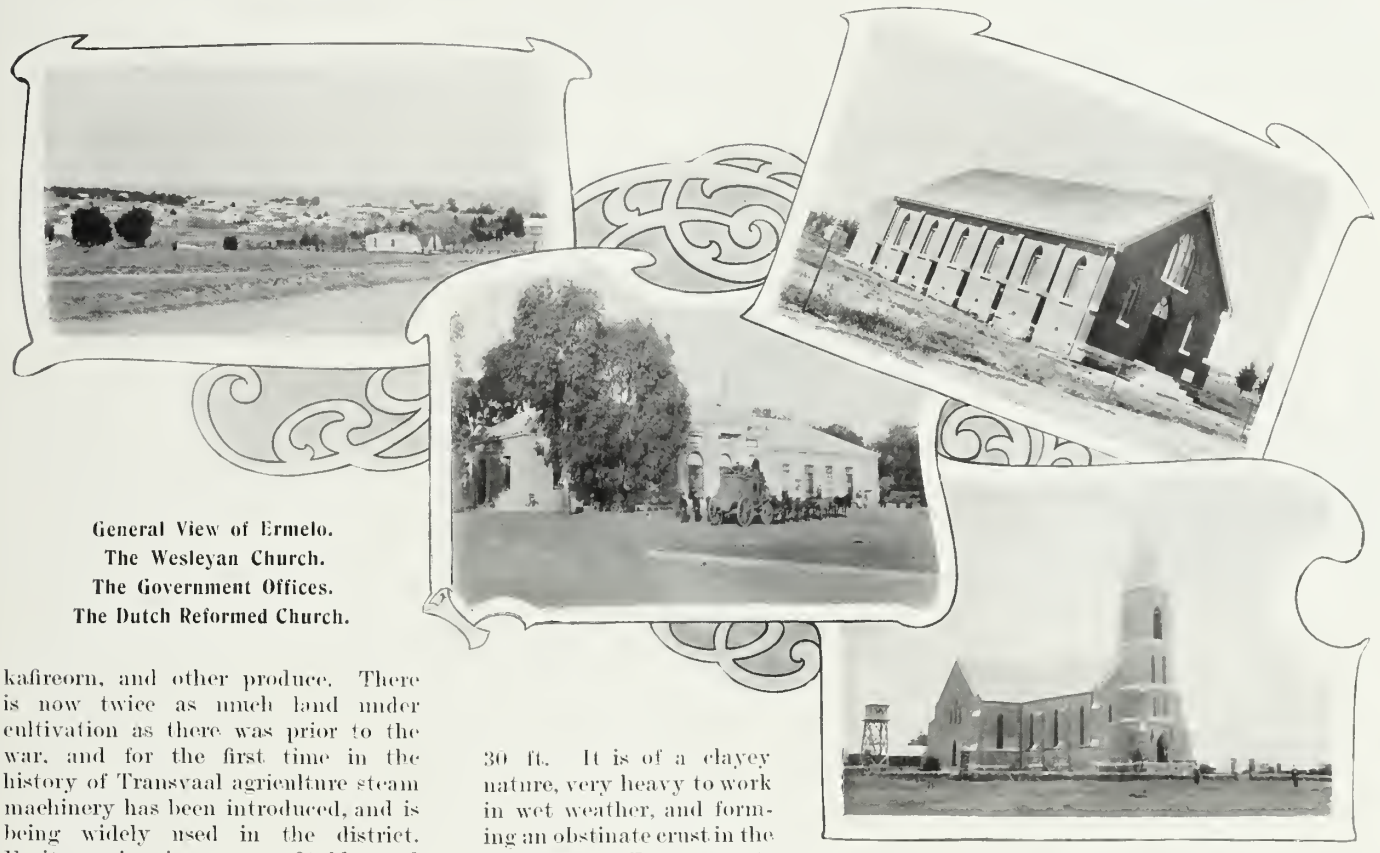
Davel.

The new township of Davel, on the recently completed extension of the Springs-Eastward line to Breyten, was surveyed by Mr. C. W. Lucas, of Ermelo. The land upon which it stands belongs to Mr. Hendrik Hans Jacob Davel, who laid out an area of 100 morgen into 545 stands, with a market square measuring 850 by 200 Cape feet, a park, and a recreation ground. A number of trees were planted. Mr. Davel presented stands to the congregations of all religious denominations who might wish to erect churches, and also gave free stands for schools. The stands vary in extent from 50 by 100 ft. to 100 by 200 ft., the smaller being those adjoining the railway. In such a fertile district, with the advantage of good railway communication, it was not likely they would be long without purchasers. The Central South African Railways administration commenced to erect a station at Davel immediately on the completion of the line, in December, 1905. This station will be the nearest point for the town of Ermelo, and the many wealthy farmers of this neighbourhood have already taken advantage of the new facilities allowed them by this timely extension of the railway system to despatch a very considerable quantity of their produce to the Johannesburg markets. Other branches of this line, it is hoped, will be extended to Middelburg, Carolina, Volksrust, and Standerton, *viâ* Bethal, so that the whole of the district may be connected with a series of lines that will enable local agriculturists to obtain far better value for their produce. Should this hope be realised, it is easy to see that the new town of Davel will be the junction of a very important centre. Many advantages are possessed by the district as to climate, soil, and healthy conditions, mineral wealth in abundance, and plentiful supplies of good water, of which there is a sufficiency for every need in the vicinity. For railway purposes a dam was in course of construction by the Government at the time of writing. Middelburg, Volksrust, Carolina, and Standerton are all within distances varying from 35 to 46 miles, and an immense impetus has been given to every industry in all these places by the advance of the long-desired railway connection. Mr. H. H. J. Davel has been farming in the neighbourhood since 1870, though his home was originally in what is now the Orange River Colony. He owns a fine farm of 1,461 morgen, which in January, 1906, was stocked with 800 French merino sheep, 60 head of Afrikander cattle, and 14 horses. Mr. Davel had about 400 acres under mealies, and 280 acres carrying oats. He is also the owner of another farm a few miles from Davel, where there is a fine deposit of coal, which, however, has not been much worked. It is possible that it may now be opened up; but Mr. Davel takes far more interest in agricultural than in mining pursuits, and he would rather let his coal farm pass into other hands for development. Mr. Davel is a member of the Agricultural Society of Ermelo district.

Ermelo.

The district of Ermelo, in the Eastern Transvaal—one of the most fertile in the Colony—presents many special features of interest. Its industries are agriculture and stock-raising, and it may be said to be comparatively free from many of the stock diseases and other pests that make up the troubles of the South African farmer in other parts of the sub-continent. The district, which was apportioned from the Lydenburg, Middelburg, and Volksrust divisions, is bounded on the east by the Swaziland border. It lies partly on the High Veld, at an elevation of from 5,000 ft. to 6,000 ft., and partly in the Low Veld regions near

Swaziland and the Portuguese territories. In these lower lands fever is more or less prevalent. In the Ermelo district sheep farming is found to be beyond question the most lucrative. It contains upwards of 200,000 sheep and 15,000 head of cattle, and this in spite of heavy losses entailed by the war. The wool industry is a staple one, and the farmers are commencing to be alive to the necessity for improving not only their stock but their methods, in order to compete with advantage in the wool markets of the world. Mealies are grown throughout Ermelo district in great abundance, some 30,000 acres carrying this crop, while about 15,000 acres are under wheat, barley, oats, chiefly of silica, iron oxide, and decayed vegetable matter, produces crops with little trouble, needing neither fertiliser or irrigation. Crops grown on this soil have been known to yield from 150- to 160-fold without artificial assistance of any sort, and the results may be considered fairly assured beforehand. For this reason the Boer farmers have been perfectly content to raise crops without any effort to improve their methods. The turf soil is a thick argillaceous soil rich in vegetable matter, of the nature of an alluvial deposit. It lies in the many "vleis" and river beds that abound in the district, and varies in depth from 6 ft. to loss to the land, but reduces the strength of the herds by long treks and change of climate and pasturage. It has been repeatedly demonstrated that such a course is undesirable, and that sheep and cattle thrive in winter not only on the High Veld of the Transvaal but in the high lands of countries with a far more rigorous climate; but without avail. Another pernicious practice is that of burning off the veld, sometimes as often as twice a year. This practice has survived from the days when the High Veld of the Eastern Transvaal carried grass shoulder high, which fed and protected vast herds of game. These had to be exterminated to enable the



General View of Ermelo.
The Wesleyan Church.
The Government Offices.
The Dutch Reformed Church.

kafircorn, and other produce. There is now twice as much land under cultivation as there was prior to the war, and for the first time in the history of Transvaal agriculture steam machinery has been introduced, and is being widely used in the district. Fruit-growing is very profitable, and succeeds with little difficulty; forestry has proved eminently successful, and attempts in this direction will so alter and improve the country as to be a great factor in its future progress and prosperity. The Government has expropriated a tract of some thousand acres adjoining the town of Ermelo for experiments in arboriculture, and the success of this has been so marked since the conclusion of peace that many of the farmers are planting numbers of trees near their homesteads. Oaks, cedars, poplars and willows are in great favour. The soil is of two varieties, the turf and the "rooigrond." The latter, a heavy red soil composed 30 ft. It is of a clayey nature, very heavy to work in wet weather, and forming an obstinate crust in the dry season. Few attempts have been made to cultivate these lands on account of their intractable nature, and the possibilities of a soil that retains its moisture throughout the dry season have remained untested through sheer lack of enterprise. In addition to this lamentable trait, farmers in these richly-endowed districts of the Transvaal pursue two courses, with a persistence worthy of a better cause, that would cripple agricultural resource in any other part of the world. One is the custom of trekking with flocks and herds to the Low Veld pastures in the winter months, instead of planting belts of trees for shelter, and growing winter forage. This not only means a farmer to pursue his industry, and the first step towards this object was to destroy the coverts among which the wild animals subsisted. The practice was handed down in a meaningless manner as a thing that was always to be done, and fine pastures, which formerly supported herds in thousands, have vanished with the game. There is no reason to suppose that the veld in its natural condition should not support the same number of domesticated cattle as it did of wild animals, but the constant veld fires destroy the surface soil, kill the finer grasses, consume the decaying vegetation that makes for fertility, and choke up the soil with

ash and grit, rendering it less porous and tractable year by year. Horses bred in the Ermelo district were at one time considered second to none in South Africa, excepting the fine Colesberg breeds. This stock has been much neglected, and the old breed is rarely now seen. There is, however, no reason why the industry should not be revived with the greatest success. The geological features of the country are peculiar, and of coal and sundry base metals there would appear to be an abundance. The stratification is horizontal and of recent formation, the coal areas covering two-thirds of the entire district. The seams average in width from 6 ft. to 10 ft. Above the coal there is a layer of first class building sandstone, clean-grained and easy to work, of which most of the public buildings in the district have been constructed. It would be highly profitable were the quarries on a business basis, as the stone could be procured cheaply, and would supply a great demand on the Rand and all over the Transvaal. On the Low Veld grey granite forms the foundations of all the hills and kopjes. This part of the country is very broken and highly mineralised—gold, copper, asbestos, tin, graphite, mica, antimony, and quicksilver being found in patches, though, with few exeeptions, not in sufficient quantities to be payable. Work can only be carried on by Europeans in this part of the district from about May to September, on account of the climatic conditions. There are many hot sulphur springs—known by the Boers as "warm baths"—and in the season these are usually thronged with visitors. Water is found in abundance, and the soil is fertile, but is little cultivated, the lands being only used for the stock-grazing in winter. In the Lake Chrissie portion of the division the chief interest lies in the groups of "pans," mostly dry, the largest of which is Lake Chrissie itself, now almost dried up. These "pans" are crater-like depressions on the High Veld north-east of Ermelo. In those not yet dry the water is somewhat brackish; in other instances it is fresh. There is evidence that these pans were once large lakes, but siltage has destroyed the springs supply from which they were fed. Fringing these pans of caked mud is a layer of rock resembling sandstone, which, from the rhomboidal shapes it assumes after exposure to the weather when used for building purposes, is plainly of volcanic origin. The beds of these pans are so deeply buried in caked mud that it has been impossible to ascertain the nature of the rock forming the foundation. The soil around is poor in quality and wretched for agricultural purposes. A Government settlement of some 38 families has been placed here since the war, and in spite of the unpropitious nature of this portion of the country, appear to be hopeful and contented. A peculiar feature of the Ermelo district are the "water-kuilen," or holes in the springs and marsh lands. These are scattered about in great numbers, and preserve the same depth winter and summer, the waters being always fresh and clear. The bottoms are sandy, and it is fairly plain that they are fed from an underground source, percolating through the sandy soil. The "kuilen" are fringed with a coarse grassy or reedy growth which makes excellent fodder for horses and cattle. The springs are of two kinds, open and "eyfer." The open springs have their sources at or near the tops of hillocks and elevations. The "eyferfonteins" ooze from a fairly large area of moist or boggy ground. The whole district, though possessing no rivers of importance, is intersected with streams and "spruits," which are often dry in winter, and "come down" in heavy torrent during the rainy season. In the Low Country these springs often have a very sharp gradient, and much valuable soil is continually being washed away, the land in their neighbourhood being cut into a succession of huge dongas or canyons. The rise of these streams in flood-time is very great and rapid.

The Spitzkop Rocks, near Ermelo.

The town of Ermelo is situated about 40 miles from the Swaziland border, and 60 miles equally from Standerton, Middelburg, and Volksrust. It lies between the Tafelkop, the only prominent topographical feature of the neighbourhood, and the Rooirandjes, a series of ridges of ironstone. The township was laid out in 1880 by the congregation of the Dutch Reformed Church, who approached the Government with a petition for the right to build a town and erect a church on two farms reserved for this purpose in the district. The need for a town was great, owing to the distance to be traversed to the nearest centre, but the boon was refused by the Government. The members of the Church then purchased the present site, part of the farm "Nooitgedacht," from Mr. P. F. Fourie, on which the congregation built the town, which they named after Ermelo in Holland, erecting their church in a central position, on what is still known as Church Square. Ermelo consists of rectangular blocks of erven 480 ft. square, each erf measuring 120 ft. by 240 ft. There are over 1,100 erven in the town area, or

about 3,000 morgen, but much of this land is owned by speculators, and is not thrown open to building enterprise. Since the war three new suburbs have sprung up, New Ermelo, Areadia, and Bellevue, adjoining the town lands. Plots in these suburbs were freely sold, both locally and in Johannesburg and Durban, fetching from £15 to £25 per plot of 100 ft. by 200 ft. in extent. Building has lately proceeded apace in these new suburbs. The town is well planted with trees, and is watered by some twenty perennial springs, which give a flow of over 6,000 gallons of water per hour. No effort has hitherto been made by the local or Government authorities to conserve this valuable supply, to check waste, or to prevent contamination. Every property owner, by taking the trouble to bore for it, can be sure of a plentiful water supply on his own premises. Coal abounds in the neighbourhood, and the town lands supply Ermelo's wants in this respect. In 1896 the town lands were transferred to the Government, with the exception of the Church Square and a few erven—which were retained by the congregation of the Dutch Reformed Church. This was then declared the magisterial centre of a proclaimed district. Telegraphic communication was established in 1888, and the Springs-Eastward extension of the Central South African Railways was carried through the district, not far distant from the town, in 1905. A good coach service plies between Ermelo and the railway station, and post carts run between the various towns of the district, three travelling to and from Standerton, two to Wonderfontein, *viâ* Carolina and Lake Chrissie, and one to Volksrust, weekly. In 1903 Ermelo was granted an Urban Board, and in the following year received municipal rights. The Town Council has eight members, and Dr. Everard, one of the earliest settlers in Ermelo (having resided there since 1885), has been Chairman since the Council was formed. The rateable value of the town of Ermelo is £211,180, and the inhabitants pay a rate of 1d. in the £. The municipality is entirely free from debt. The climate is healthy and bracing, frequently very cold, and in September snow and heavy hailstorms are to be feared. The rainfall for seven years ending 1903 in the district was 27 inches. Ermelo is the headquarters for the Eastern District division of the South African Constabulary, and of the "F" troop of the Eastern Rifles. The Public Works Department's officials for the Eastern Transvaal also have their headquarters in the town. The Government buildings are substantial and well situated. Government property in the town is valued at £26,176. There is a public library containing from 700 to 800 works, Government primary and secondary schools, an independent Dutch school which is powerfully supported, and a Wesleyan Church, in addition to the Dutch Reformed Church, a substantial structure standing on Church Square. Funds are being raised for the erection of an Anglican Church. There are branches of the Natal Bank and the National Bank of South Africa in the town. The population of Ermelo numbers about 1,400 of all nationalities. During the war Ermelo was destroyed with the exception of one house, which was left undisturbed by the troops, the occupants being an invalid lady and her daughter.

Members of the Ermelo Municipal Council, and Officials, 1905.

Mr. W. R. COLLINS.

Mr. William Richard Collins, a member of the Ermelo Municipal Council, was born and brought up in the Transvaal, and should therefore be a good judge of the country and its prospects. He is a solicitor and notary by profession, and is well in touch with local interests. Mr. Collins settled in Ermelo in 1902, is a Justice of the Peace, and Deputy Sheriff, secretary to the local branch of "Het Volk," which has an influential following in this district, and, it is hardly necessary to add, holds strong political views. Mr. Collins is a firm believer in the possibilities of the Ermelo district, which he considers second to none in the Transvaal for stock-raising and produce—the richest portion being actually that lying between Ermelo and Bethal. As proof of what can be accomplished by industry and intelligence, he cites the fact that whereas in 1902 there were only 5,000 sheep in the Ermelo district, and the wool trade was in consequence practically extinct, there were at the end of 1905 close upon 500,000 sheep, and the industry was once more assuming large proportions. The quantity of mealies and kafircorn grown in Ermelo district is so great that for the last two years Swaziland has practically drawn all her supplies from there. On account of the good climate and freedom from disease that is enjoyed by the district of Ermelo, the Government has selected it as the *locale* of many interesting experiments in stock and poultry-raising, forestry, fruit-growing, etc., and from the results of these efforts Mr. Collins augurs many hopeful prospects for the Eastern Transvaal.

Mr. C. D. LUCAS.

Mr. Claude Davis Lucas was born at Queenstown, Cape Colony, and educated at Grahamstown. On the completion of his studies he adopted surveying as his profession. From

1894 to 1903 he held the position of Government Surveyor at Kimberley. He then settled in Ermelo, where he started the practice of his profession. Mr. Lucas is keenly interested in all kinds of sport, and endeavours to create a similar interest in others. He also devotes a great part of his time to scientific research, and is deeply versed in astronomy and meteorology.

Mr. JAN WILLEM PET.

Mr. Jan Willem Pet, born in the Dutch East Indies, sailed for South Africa in 1890, with a view to practising his profession of notary. He trekked to the Transvaal and selected Ermelo as his place of residence in 1891, and has made that township his home ever since. He was elected to the Municipal Council in 1903, and now holds the position of Deputy-Chairman. He is keenly interested in the railway, commercial, and mineral development of the district, and indeed owns large mineral rights himself, being half owner of a valuable coal property adjoining the town lands. This property has been worked for fifteen years, but only in the most primitive manner; and as the quality of the yield is excellent, supplying both steam and household coal, and the quantity is plentiful, Mr. Pet only awaits the advent of railway communication to develop his property according to the most up-to-date methods and ideas. The town has been sadly hampered in all such enterprises by the lack of proper means of communication with market centres for its valuable produce, wagon transport being slow, unsatisfactory, and exceedingly costly. The new railway, however, will alter all that. Mr. Pet claims that the quality of the coal found on his property is as good as any in South Africa, and the seam averages 10 ft. It will stand working on a very much larger scale than anything attempted hitherto. The farm on which it exists is at present a Government experimental farm, but it has been arranged that should the owners need more ground for development purposes the Government will grant such necessary extension of ground at a valuation, to be decided by arbitration. At present this mine supplies the local coal trade. As the district is so rich in this mineral, it is possible that it may attract the attention of experienced and substantial firms, and should this happen, and developments on a large scale be inaugurated, it is not unlikely that Mr. Pet may modify his present plans and adopt others which will bring him into line with any big movement which may be put on foot.

THE PHŒNIX HOTEL.

The Phœnix Hotel, Ermelo, is the largest hostelry in the Eastern Transvaal, and was originally erected on its present site in 1898. During the progress of hostilities in the war period the hotel suffered the fate of many other buildings, both public and private, and was burnt to the ground. But in 1902 a new Phœnix rose from the ashes, and a similar building to that which was destroyed now stands on the original site. The structure is of a substantial description, being built of burnt brick and stone, and besides spacious reception rooms, consisting of drawing-room, dining-room, and smoking-room, there is a billiard-room with two tables, and 28 bedrooms. The furnishing is good throughout, and the hotel has excellent stabling, with accommodation for forty horses —a most necessary provision in the outlying districts of the Transvaal. The ground floor is partly let in sections to various tenants, one portion comprising the premises of the local branch of the National Bank of South Africa. The management of the Phœnix Hotel for the past five years has been in the hands of Mr. Bloomfield; at the time of writing the premises are leased to Messrs. Bloomfield & Rust, who take every imaginable trouble to give satisfaction to their guests, and who understand well how to make their establishment comfortable and attractive. Mr. Bloomfield, who was born in Edinburgh, made his home in South Africa from very early years, for he first landed in the country with his parents when he was three and a half years old. Mr. Bloomfield has all the post-cart agencies for conveying the mails from Ermelo to the neighbouring townships.

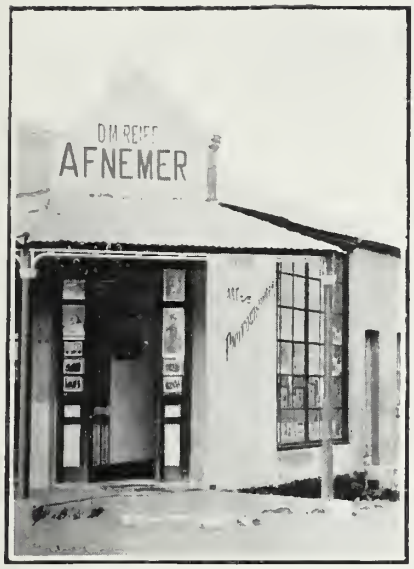
The Phœnix Hotel, Ermelo.

Dining-room of the Phœnix Hotel, Ermelo.

Mr. D. M. REIFF.

Mr. Reiff, who has a photographic establishment in Ermelo, is of German nationality, and served his apprenticeship to the profession of photography in his native country. He arrived in South Africa in 1893, and, proceeding to the Transvaal, worked for six years in the Goch Studio in Johannesburg. Later on he severed this connection and purchased an established business in Ermelo, where he has been pursuing his avocation since the war. During the continuance of hostilities Mr. Reiff had the management of Talba's business, in Kimberley, one of the largest photographic establishments in South Africa. Mr. Reiff has been of assistance in the production of the Ermelo and district illustrations appearing in this work. In his studio may be seen some excellent specimens of the photographer's art.

PANORAMIC VIEW OF GERMISTON.



Premises of Mr. D. M. Reiff, Ermelo.

MESSRS. C. GROENEWALD ROBERTSON & CO.

Mr. Charles Groenewald Robertson, one of the pioneers of Ermelo, settled in that district as far back as 1889. He was one of the first to acquire land and to build in the newly-laid-out township, and formed great views as to its future prosperity. He opened a store, and by the exercise of much determination and forethought succeeded in placing himself in the position he now enjoys, his business being one of the largest and most successful in the Eastern Transvaal. Mr. Robertson also deals in wool very extensively. He has always taken an interest in agricultural operations, but since the war has not actively engaged in any farming on his own account. He does not, however, cease to take pleasure in the growth of such progressive measures as are daily being introduced for the benefit and improvement of the agricultural holdings in South Africa, and watches with interest each new advance. As one who has seen, from the early Sixties, the wild Veld (once overrun with game) gradually come under cultivation, the game giving place to stock, and towns and farms absorbing the waste land, his past experiences should be of interest generally. Mr. Robertson has been associated with the Municipal Council of Ermelo since its inception. He was one of the foundation members, and still retains his seat.

Business Premises of Robertson & Co., Ermelo.

MR. ARTHUR JAMES SPERRYN.

Mr. Arthur James Sperryn is a native of London, and arrived in South Africa in 1894. Although by profession an accountant, it was not until after the war that he actively practised in the Transvaal. Mr. Sperryn is recognised as one of the most progressive of the citizens of Ermelo. He is a member of the Agricultural Society, and also of the local Sporting Club, from which it may easily be gathered that he is interested in sports of all kinds. He is in particular an ardent devotee of the popular game of golf. Mr. Sperryn is one of the Justices of the Peace for Ermelo, and in 1905 was elected to the Municipal Council. He is one of the citizens who worked enthusiastically to secure railway communication for the town. In addition to these local duties and responsibilities, he is a member of the Incorporated Phonographic Society of England, and hon. secretary of the Natal Pitmanic Society. He is deeply interested in the advancement of the phonographic science in South Africa, and holds the above positions for no other purpose than of advancing the interests and improving the methods of that important branch of public learning throughout the country.

Germiston.

Germiston, generally assumed to be the third largest town in the Transvaal, is situated about nine miles from Johannesburg, and has a municipal area of 26 square miles. It was surveyed as a township in 1887. It is the largest mining centre on the East Rand. In 1886 Mr. Charles Knox, of Natal, who had come to South Africa from Australia, was engaged by Mr. John Jack to prospect the farm "Elandsfontein," which Messrs. Simmer & Jack, traders of Harrismith and Lake Chrissie (afterwards of the Simmer & Jack G. M. Co.), had purchased. Mr. Knox while in Australia had been one of the prospectors and pioneers of the well-known Ballarat goldfields. He received, in consideration of his services in having discovered gold on the Elandsfontein property, one-eighth share in the Simmer & Jack G. M. Co., which was originally floated for £75,000. The brother of Mr. George Farrar (now Sir George Farrar) was engineer for this Company, and his firm, Messrs.

Mr. Charles Brammer, J.P., Mayor of Germiston, 1905-6

Howard, Farrar & Co., received the contract for supplying the first 20-stamp battery used on the Simmer & Jack. Mr. Jack, deeming it essential to have in the neighbourhood a local store, presented Mr. Knox with a corner stand in the small township of Germiston, situated about a mile from the mine, which was surveyed in the year of Queen Victoria's Jubilee, and named after the birthplace of Mr. John Jack—a small village outside Glasgow. The situation of this stand is at the corner of President-street and Knox-street. At this period there were merely a few scattered houses—not more than half a dozen—where

Mr. CHAS. KNOX, of Harding (Natal),

original prospector of "Elandsfontein" for Mr. Jack, who held an option over the farm. For discovering gold on the farm Mr. Knox received one-eighth interest in the Company to be formed (floated as the Simmer & Jack G. M. Co.), with a capital of £75,000.

the prosperous township of Germiston now stands. Very few of the "old hands" of the early Germiston are left to-day, but Mr. A. Knox, who has a commercial, stock and share broker's business at the present time, recalls the names of some of the town's pioneers. These included J. J. Pistorius, R. J. V. Lambert, J. J. van Niekerk, Pieter Holtzhausen, and Tom Walker. Those were the days of the first deep levels, notably the May Deep Level and the Moss Rose Deep Level—all amalgamated with the New Primrose G. M. Company, Ltd., to-day; also of the southern series of reefs, the "Alice," the "Yellow," and the "Kimberley,"

President-street, Germiston, in 1895.

on which were pegged out many claims. The amounts due for licences, however, were enormous, and as it was thought the claims would not have paid to work, they were eventually abandoned. Mr. Knox's recollection goes back to the time when during the wet season coaches were sometimes eight days late, and transport wagons took three months to come up from Natal. Mr. Knox's late business (now being carried on under the style of Clark & Roberts) had the first trading station on the corner stand above mentioned. It consisted of a general store, hotel, butchery, bakery, steam mill, etc. It had also the first postal agency, but

President-street, Germiston, in 1905.

the mail matter handled in those days was but as a "drop in the ocean" compared with that received at Germiston at the present day. The Roads were bad, native labour plentiful, and money easily made in the Germiston of almost two decades ago. The railway from the Cape reached

A View in the Main Street, Germiston, December, 1905.

first gold properties opened up were the Simmer & Jack, the Annie May (now the May Consolidated), the Primrose, the Moss Rose, Knights, etc. Germiston about the end of 1892. The important junction of Elandsfontein was thus formed, and this—added to the outcropping reef which

South Rose Deep Mine, Germiston, 1905.

practically encircled the town—assured the prosperity of Germiston as a mining and railway centre. In 1896 fresh prospects were increased by the development of deep-level mining, and the town was completely encircled by mining claims and operations, with the natural result that the area of the township being confined within this circle—the value of ground was considerably enhanced. The Geldenhuis Deep was the first deep-level mine to start the production of gold. Our illustrations show by contrast the development of this industrial centre, which can now boast of many handsome buildings. Amongst the latest additions may be mentioned a fine Presbyterian Church, a view of which is shown on page fifty-four of this work, which cost, including the manse, £11,000. Mr. John Jack, the pioneer of Germiston, donated the handsome sum of £500 and four freehold stands which formed the nucleus of the building fund. The township has also one of the finest Masonic temples in the Transvaal. The main street of Germiston, President-street, presents an appearance of great business activity and bustle, and has many important stores. Some of the most important mines on the Rand are in this district. The influential financial companies of Johannesburg hold control of these. If the deep-level propositions turn out as successful as anticipated, the further prosperity and development of Germiston is assured. Germiston was established a municipality under the Municipal Ordinance of 1903. It has Boksburg municipality as its eastern and Johannesburg municipality as its western boundary. The population of Germiston when the census was taken in 1904 was recorded as 9,414 whites, 19,713 coloured persons—a total of 30,127.

Mr. CHAS. BRAMMER.

Mr. Chas. Brammer, J.P., Mayor of Germiston, was elected to the civic chair in October, 1905. Mr. Brammer became a member of the first elective Municipal Council in 1903, and at the 1905 election was appointed to the Council for a further period of three years. He is a member of the firm of Brammer Bros., an important drapery firm carrying on business in President-street. Mr. Brammer is a native of Leeds, and arrived at Durban, Natal, in 1884. He remained in the "Garden Colony" for a year before proceeding to the Transvaal. He was at Lake Chrissie, in the Eastern Transvaal, for the next year, and in 1887 he proceeded to Steyns-

dorp goldfields. He arrived in Johannesburg in 1889. Mr. Brammer went to Germiston as manager for Messrs. Fowlie & Moore, and subsequently started his present establishment, with which his brother, Mr. W. W. Brammer, is now associated. Prior to the constitution of the Municipal Council Mr. C. Brammer was a member of the Health Board. He is a member of the Germiston Chamber of Commerce.

Dr. ROBERT STRACHAN.

R. Strachan, M.B., C.M. (Edin.), J.P., is a native of Arbroath, Forfarshire. He arrived in South Africa in 1892, and proceeding to Germiston there commenced the practice of his profession. Associated with his partner, Dr. Dodds, he has one of the largest medical practices connected with the mining industry in the Transvaal. Dr. Strachan was one of the foundation members of the Municipal Council of Germiston: he was the first Deputy Mayor of the township, and he occupied the civic chair for the municipal term 1904-5. Dr. Strachan was the recipient of the first Mayoral chain of office in the Transvaal. This was presented to the Germiston Municipal Council conjointly by 15 of the neighbouring mining companies. Dr. Strachan is captain of the Transvaal Medical Staff Corps, and has been closely associated with the initiation of the Volunteer movement on the East Rand. He takes an abiding interest in the advancement of the district. He is one of the prominent members of the Caledonian Society, was its chief for the first two years of its existence, and in 1905 occupied the position of honorary chief of the Society.

Messrs. CLARK & ROBERTS.

The establishment controlled by Messrs. Clark & Roberts is the oldest general store in Germiston, and may be stated to be one of its largest commercial businesses. The premises of the firm, which are shortly to be rebuilt, are situated at the corner of President-street and Knox-street. The concern was acquired last year by Messrs. Luit, Dalrymple, and Hanna, who are conducting its affairs under the old style and title; they were connected with the late firm. Mr. Inglis, who is the owner of the property in which the firm's transactions are conducted, was the managing director for Messrs. Clark & Roberts, Ltd., prior to the present proprietary taking over the business.

"Clement Shaft," Germiston, 1895 (now South Rose Deep).

The establishment dates back its existence to the year 1886, when Mr. Charles Knox, of Natal, and formerly of Australia, was presented with a corner stand in the newly-surveyed township of Germiston (one of those upon which the premises under notice are built) by Mr. John Jack, for the purpose of erecting what was the pioneer store of Germiston. Mr. Alfred Knox, Mr. W. H. Knox, and Mr. James Knox were junior partners in this business with their father in the early days, Mr. A. Knox holding his father's power-of-attorney. Two years after the business was founded it was disposed of to Messrs. Clark & Roberts, and was subsequently formed into a limited liability company.

Messrs. EGGELING & WINTER.

As an example of the old adage that "small beginnings have great endings," the firm of Eggeling & Winter, the now well-known music dealers of Germiston, affords an admirable instance. Started in a small way some years ago by Mr. N. Eggeling, it grew with such rapidity that it was no easy matter to obtain adequate business premises—a difficulty by no means even now overcome. In August, 1903, Mr. Charles G. Winter entered into partnership. The firm has gone ahead with great strides ever since, and shows every sign of becoming a very large concern. Messrs. Eggeling & Winter have the valuable sole agencies for the whole of the Transvaal

Post and Telegraph Offices, Germiston.

for the "Julius Feurich" and "Carol Otto" pianos—the first maker having recently received the highest award ever given to any pianoforte maker at the Leipzig Exhibition; the latter being without question one of the best moderate-priced instruments made. The firm also are sole representatives of the Carpenter Organ Co., of the U.S.A., whose organs are not only in the highest rank but at the same time remarkably cheap. In addition the firm carries a complete stock of music and musical instruments of every imaginable kind. What strikes one most, however, is the fact of growth, and is an admirable answer to those who claim that the pre-war days were best. Messrs. Eggeling & Winter specially cater for the East Rand, which is rapidly becoming one of the most thickly-populated parts of the Reef, and from all signs the firm intends to "grow up with the country." As an example of their present position in the business world, it may be mentioned that in the short space of one week they have received consignments of pianos and organs through Durban of over 80 cases, in addition to sundries. They retain a staff of tuners and repairers. A branch has recently been opened at Heidelberg, where a well-assorted stock is also kept. Mr. Eggeling is a native of Lund, Sweden, and completed his musical education in Germany, where he received a thorough practical knowledge. He was for some years manager of a large musical house in Java. Mr. Winter comes from Australia. Messrs. Eggeling & Winter's success is attributable to the fact that in addition to ability they observe the strictest principles of business rectitude, and such being the case are bound to go on and prosper.

Offices of Brammer & Orr, Germiston.

Interior of Clark & Roberts's Store, Germiston.

Messrs. BRAMMER & ORR.

This Germiston firm of professional accountants and auditors, estate and insurance agents, stock and share brokers, was taken over by Messrs Brammer & Orr in succession to Mr. Robert Urie in September, 1904, also succeeding that firm in the secretaryship of the local Building Society. Messrs. Brammer & Orr's offices are situated in Knox-street, where an important business is carried on. The partners in the firm are Mr. G. F. Brammer and Mr. Orr. The former is a comparatively new arrival in South Africa, where he settled in 1903. Mr. Brammer is a native of Manchester, and is a registered public accountant. Mr. Orr hails from Glasgow, and landed in South Africa also in 1903. He is an accountant by profession.

Messrs. GEAR & CALDERHEAD.

The business established at Germiston by Messrs. Brammer & Evans in 1891, was taken over in 1901, before the close of hostilities, by Messrs. Gear & Calderhead, whose name is now so well-known on the East Rand as purveyors of high-class groceries, etc. Mr. Gear and Mr. Calderhead, previously to joining in partnership, were associated with the Germiston branch of Messrs. P. Amm & Sons, and consequently have been established in this East Rand Railway town longer than

WINTER'S MUSIC WAREHOUSE, GERMISTON.

PREMISES OF GEAR & CALDERHEAD, GERMISTON.

any other firm in the same line of business. Their house deals in groceries of the best qualities, hardware, ironmongery, electroware, linoleum, and many other essential lines; and it will always be found that it is a satisfactory firm to deal with. Being direct importers, Messrs. Gear & Calderhead naturally have to keep large stocks, and they therefore contemplate building their own premises in the near future. These will be on a greatly extended scale, to accommodate their increasing trade, the present stores being totally inadequate, although occupying a space measuring seventy-five by a hundred feet. Mr. John Gear is a native of Shetland, N.B., and has resided in South Africa since 1894. His partner, Mr. James Calderhead, comes from Glasgow, and has spent practically the same time in South Africa as Mr. Gear. Both partners served their apprenticeship to the business before starting on their own account, and are thoroughly practical and competent men, as the flourishing trade conditions of their house prove.

Interior of Hardie & Symington's Store, Germiston.

MESSRS. HARDIE & SYMINGTON.

This well-known firm of ironmongers and tool merchants was established in the first instance at Boksburg in 1898, and immediately after the war opened a branch in Germiston, of which Mr. Hardie is the managing partner. The stand on which their premises are situated, together with the handsome two-storey building, is the property of the firm. The store was re-built in 1905, the first establishment having been destroyed by fire. The frontage to the main street is about 59 ft. The adjoining store, occupied by Mr. J. R. Bold, jeweller, is also the property of the firm. An inspection of Messrs. Hardie & Symington's premises discloses to view an extremely large stock. While perhaps one of the principal departments embraces tools, workmen's appliances and builders' materials, household requisites also comprise a comprehensive portion of the goods carried. The basement of the building is devoted to such lines as sheet glass, paints and colours, and the heavier classes of goods generally. Above the basement are the main showrooms, and upstairs on the first floor may be inspected a variety of goods too numerous to mention here. The firm send their carts along the Reef to facilitate the delivery of tools, etc., to their customers working on the mines. (In the Boksburg section will be found further notes dealing with Messrs. Hardie & Symington's business.)

Front Shop of Hardie & Symington, Germiston.

THE KING'S HOTEL.

The King's Hotel is centrally situated in President-street, Germiston, and was completed in 1905. It stands on the site formerly occupied by the President Hotel. The establishment is decidedly one of the best commercial hotels in Germiston. The new building contains 14 bedrooms, in addition to the usual dining-room, drawing-room, and billiard-room accommodation. The proprietor is Mr. L. Tait who is also owner of the Masonic Hotel in the same town. Mr. Tait has been in the Transvaal since 1889, and is a native of Newcastle-on-Tyne. Prior to the war he was resident in Johannes-

burg. He proceeded to Germiston after the declaration of peace. The King's Hotel enjoys an excellent reputation, and the charges are moderate. The establishment can be safely recommended to the visiting and travelling public.

The King's Hotel, Germiston.

Messrs. E. J. PHILLIPS & CO.

Mr. E. J. Phillips, who has been a resident of Germiston since 1887, and is well known as one of the pioneers of the Rand, is a Londoner by birth, and first arrived in South Africa in 1870. He, however, did not stay in the country for any length of time on that occasion, but left for America. He returned in December, 1874, to East London, and was employed for a few years afterwards on the harbour works at that port. Later he entered the service of the East London and Aliwal North railway, and in 1887 proceeded to the Transvaal, making his way to Germiston after only a fortnight's stay in Johannesburg. Mr. Phillips was first employed in starting the old Moss Rose battery, at a time when there were barely a half-dozen buildings in the now flourishing business centre of Germiston, and was responsible for the erection of the first battery on the Spes Bona Gold-mining Company's property. It may be mentioned that he erected the fourth house in Germiston, and during those early days he had the good fortune to purchase upwards of 12 stands in the new township, for which he paid £15 each. He holds two of these stands, upon which he has

E. J. Phillips & Co., Germiston.

I.—Store. II. and III.—Showrooms.

erected five handsome two-storey shops, the ground of which alone, apart from the buildings, is now valued at £10,000. Mr. Phillips recollects the early days when Germiston could not boast of a church. Himself a non-sectarian, and the Presbyterian denomination being numerically the strongest, services were frequently held in the only store in the town, and occasionally in Mr. Phillips's dwelling. What a contrast to the Germiston of to-day! Eighteen years only have elapsed, and fine ecclesiastical edifices of all denominations exist, with a sufficient capacity to accommodate in every instance the large congregations attending. Mr. Phillips is interested in other properties in addition to those already mentioned, including a nice two-storey residence which he himself occupies. In December, 1902, the subject of these notes started a furniture business, together with his son, in one of his shops. Mr. Phillips has in course of erection a fine building where in future he will continue to carry on business on a large scale. The furniture store faces President-street, has a large double frontage, and is well stocked with every furnishing requisite. Some idea of the class of goods kept, which are imported direct, may be gained from the illustrations appearing on page 400. The business is under the personal supervision and management of Mr. Phillips's son. Mr. Phillips, as also his son, served throughout the Boer war in Driscoll's Scouts, resigning with the rank of lieutenant.

Messrs. STEIN BROS.

The firm of Messrs. Stein Brothers, tailors and outfitters, established themselves at Germiston in 1895, in a small store opposite the premises they at present occupy. It is difficult to believe that the energetic brothers who started that little venture could have imagined the important dimensions it was going to assume. The situation of the store is at the corner of President and Main-streets, and has a plate glass frontage of nine hundred feet, this being undoubtedly the largest that the town of Germiston can boast of. The business is no less important, as it extends the length of the East Rand, and can boast of stock of the highest quality selected from the best manufactories of England and San Francisco, whence the firm mainly obtains its supplies. In addition to complete gentlemen's and juvenile outfitting departments, another branch undertakes tailoring to order, and none but the best cutters are employed; it follows that their goods are in great demand along the Eastern Reef, where the best obtainable is always the most popular. The firm is fully entitled to the reward which does not fail to attend such correct business methods, and a steady, satisfactory, and increasing connection is being daily built up. Mr. Karl Stein emigrated to South Africa from his native land, Westphalia, in Germany, in 1886, and was followed two years later by his brother and present partner, Mr. Leo Stein. Mr. Karl Stein visited the Rand in 1889, but preferred to return to the Cape Colony, where he established himself, and it was not till 1895 that he eventually settled in Germiston, joining his brother, who

PREMISES OF STEIN BROS., GERMISTON.

Exterior of Young & Young's Establishment, Germiston.

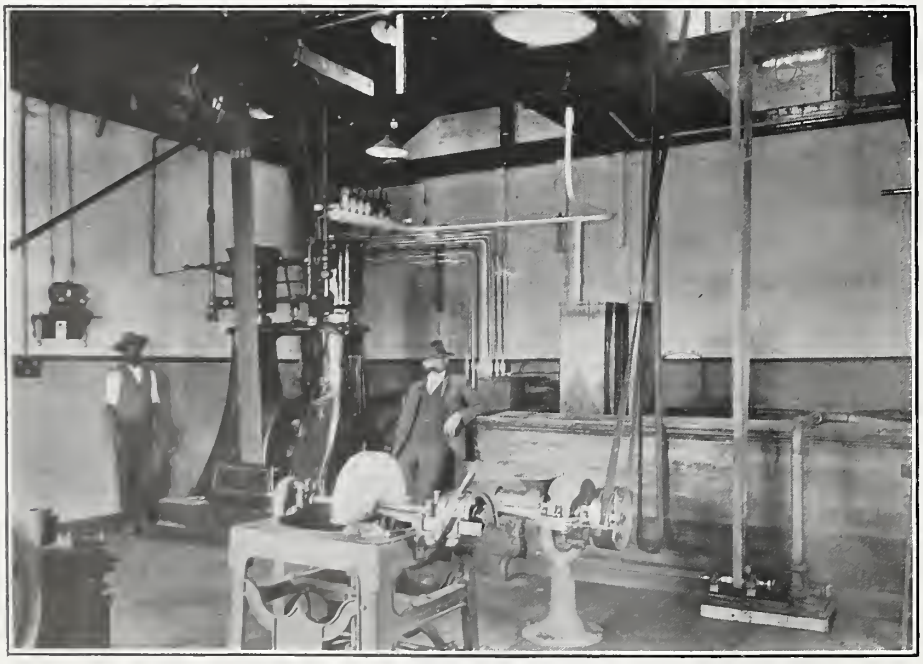
had made all necessary preparations for opening the establishment which now bears their name.

MESSRS. YOUNG & YOUNG.

The inability of the country to supply its own requirements in the direction of meat, owing to the disorganisation of its resources brought about by the late war, proved the birth of "cold storage" in South Africa. Imported meat and sundries of all descriptions became an immediate necessity, and facilities for storing and conveying the meat were at once required. The common prejudice against frozen meat, which is, more often than not, an effort of the imagination rather than an indication of the power to distinguish between fresh and frozen meat, is gradually being overcome. Cold storage is firmly established in South Africa for ever, and therefore we feel that a work such as this, embodying the industries of the Transvaal, would not be complete without some reference to the model establishment of Messrs. Young & Young, at Germiston. This firm opened a cold storage on the 1st May, 1903, and have storage capacity to the extent of 30,000 cubic feet, in addition to which they have an ice-making plant, the capacity of which is three tons per diem. The chambers are clean and fresh, and are insulated on the most modern methods. The whole work of

View of Works, Young & Young, Germiston.

keeping the temperature of the various rooms down is performed by a Hercules Compressor of 12½ tons refrigerating capacity, driven by an electric motor of 33 h.p. Attached to the cold storage is a retail shop, where everything in the way of meat, fish and game may be had, from the choicest of steak to the humble kipper. Messrs. Young & Young do a large business with the mines in the district, and, by careful management, have held their own during the unparalleled depression of the last three years. To ensure the meat being in the very best of condition on arrival from the coast, Messrs. Young & Young have laid down a siding from the main line to their premises, and the meat is, therefore, very little over forty hours on the road from the coast (being conveyed in insulated trucks), which ensures its arrival at Germiston in the very best of condition, and obviates the necessity



Young & Young's Machine-room.

Young & Young's Delivery Carts.

of bringing it per trolley from the station. The whole business is typically modern, and it is to be hoped that Messrs. Young & Young, with the lifting of the depression and the advent of more stable and prosperous times, may earn the reward of their enterprise. It is only necessary to add that Messrs. Young & Young's cold storage is the best in the provincial towns of the Transvaal, and is conducted on the most up-to-date lines. The partners are Mr. A. W. Young, Mr. K. U. Duncan, and Mr. G. H. Butt, the two former being the managing partners at Germiston. Mr. Young, at present a member of the Germiston Town Council, has had long experience in the cold storage business.

Young & Young's Retail Department.

Fish Chamber in Young & Young's Cold Storage.

Messrs. J. R. Watt & Co.

The business of J. R. Watt & Co., timber merchants, woodworking machinists, builders and contractors, was established at Germiston by Mr. Watt in 1894. The title of the firm was formerly Watt & McPhail, but the partnership was dissolved in 1897, and Mr. Watt now controls the concern entirely on his own account. The commencement was made of what is now an important and extensive business in premises consisting of a shop measuring 24 ft. by 12 ft. The present works, stores, and offices, opened in May, 1905, covering seven stands, and erected by the firm, are situated (on the opposite side of the railway line to where the early shop stood) at the corner of Garden Road, Park Road, and Charles-street, Georgetown, Germiston. Attached to the establishment is a timber mill, mostly used for sawing and moulding purposes. This is said to be, if not the largest, the best equipped mill in the Transvaal. The offices are commodious and well-appointed. The warehouse and showrooms are crowded with stocks of the varying merchandise dealt in by the firm. The average staff employed by Watt & Co., including clerical, mechanical, and native hands, numbers from 75 to 100, and has been higher. The sawmill is exceedingly well arranged. It is worked by electric power, the dynamos being in the basement below the mill. This arrangement gives compactness to the works, largely economises space, and ensures safety.

Mr. Watts is a native of Aberdeenshire and arrived in South Africa in 1894. He passed an architect's examination at Gordon's College, Aberdeen.

Entrance to the Glass Store, J. R. Watt & Co., Germiston.

and is proficient in all the branches of his business. Prior to settling in South Africa he spent five years in New York. An inspection of the stock reveals stacks of all classes of building material, and large quantities of glass, which is imported direct by the firm. Overhead mechanical appliances are used to facilitate the handling of the enormous cases in which the glass arrives from oversea. Messrs. Watt & Co. are the largest contractors on the East Rand. Among the buildings erected by them may be mentioned the Anglican churches in Germiston and Fordsburg, the Waverley Building, Knox-street, Germiston, and a large two-storey building and basement at Vogelfontein. The entire establishment of Messrs. Watt & Co. is designed with a view to carrying very large stocks, and every possible mechanical appliance is used for the purpose of economy in handling. The timber yards contain bulks of timber and planking of numerous classes and descriptions, comprising Baltic and Oregon pines, poplar, teak, and ceiling and flooring boards. There are also stored in the yards stocks of iron, cement, lime, window and door frames, hardware and builders' requisites, and everything required for a well-equipped establishment such as the one described above. In the sawmill the best and most ingenious machinery is used, and up-to-date appliances are adapted wherever skill can be combined with rapidity of execution, and care in detail.

Sawmills of J. R. Watt & Co.

Messrs. Toland, Coulter & Co.

The business controlled by Messrs. Toland, Coulter & Co. in Germiston was started in 1887 by Messrs. P. Amm & Sons, the well-known provision merchants of Johannesburg, and was taken over by the present firm in 1902. It is located in Amm's Buildings, situated in the centre of President-street. The imposing frontage extends for 65 ft. to the street, and the window display shows a really fine selection of the varied stocks imported by the firm. It is one of the largest businesses catering for ladies' ready-made goods in Germiston. Everything kept is of the firm's own importation, and the business has a very large *clientèle* in the town and district. While there are many drapery establishments in this township, but few can compare with this house in the attention paid to the selection of the stock on view in their establishment. It is large, well assorted, of the very latest fashion, and at prices which appear very reasonable in comparison with other firms. Messrs. Toland, Coulter & Co., who have also a branch in Fordsburg, in addition to the Germiston establishment, have made themselves quite a popular institution, largely owing to their capable methods of business management, and the individual attention they give their customers. Their buying department is in the hands of Messrs. Mackinlay & Co., of No. 2, Coleman-street, London, E.C.

Toland, Coulter & Co., Germiston.

I.—Business Premises. II.—Interior. III.—Interior of Fordsburg Premises.

Heidelberg.

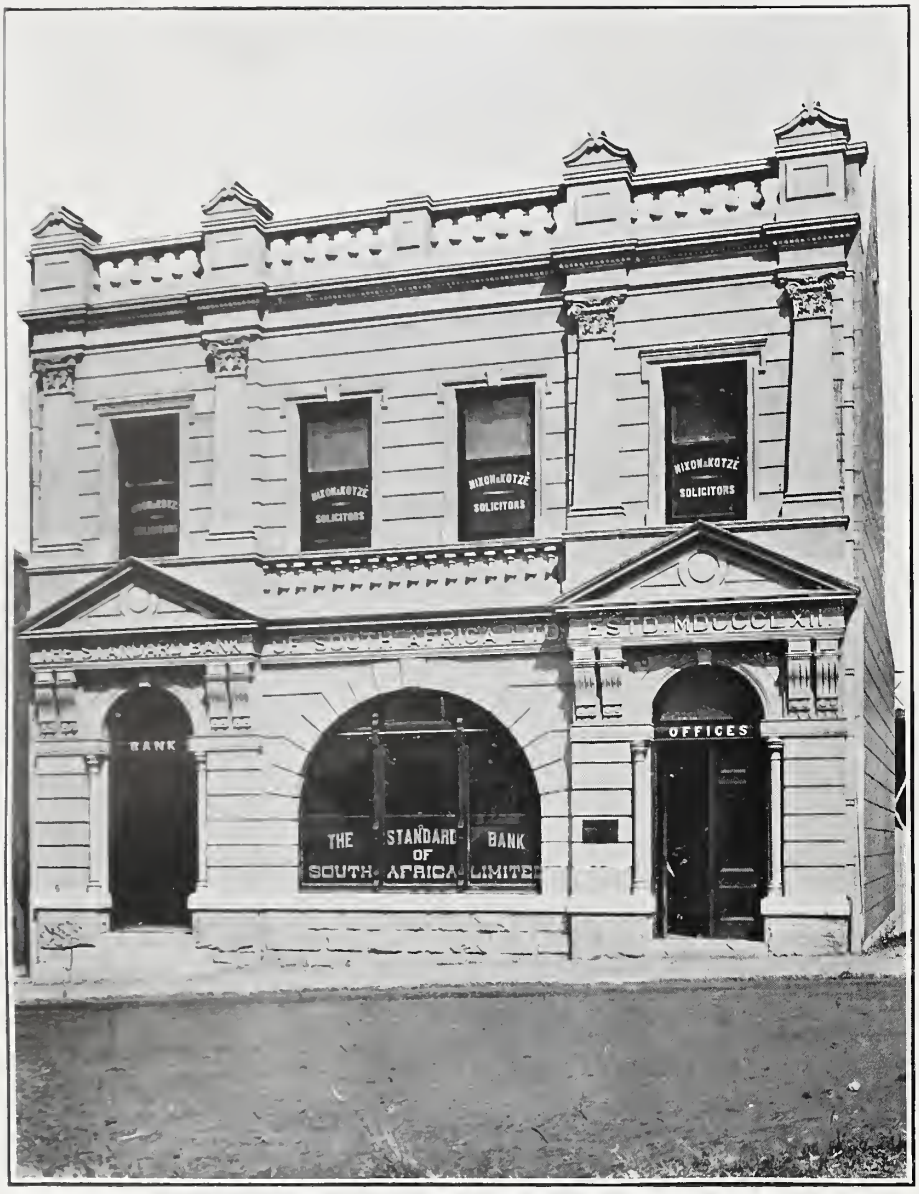
Laid out on the slope of an inclined plain in the early days of Dutch settlements, Heidelberg, as a township, has earned the reputation of being one of the finest, the most compact, and the prettiest "dorps" in the Transvaal. It was originally surveyed and dissected into erven in 1861, but notwithstanding the fact that it was on the direct wagon road from Durban to the Rand and further up-country, the growth of the town was extremely slow. Since the railway passed through the district vast strides have been made, until to-day it is a prosperous centre of industry. Only 42 miles from Johannesburg, the population at the taking of the last census was 1,838 white persons and 1,381 coloured. From a health point of view the town is ideally situated, being 5,029 ft. above sea level. It is considered the best sanatorium in the Transvaal.

During the first Boer war (1880-81) Heidelberg was the headquarters of the Dutch, and even now the building stands in the centre of the town which at that time was the venue of the Executive Council. There also is the chamber in which Sir Evelyn

Mr. A. von Gensan, Mayor of Heidelberg.

Wood signed the treaty that constituted the terms of peace. With the development of the Witwatersrand, Heidelberg became an important centre, and the Government, recognising this, erected several substantial buildings, such as the Court House, Post Office, Customs and Mining Commissioner's offices, and a public school.

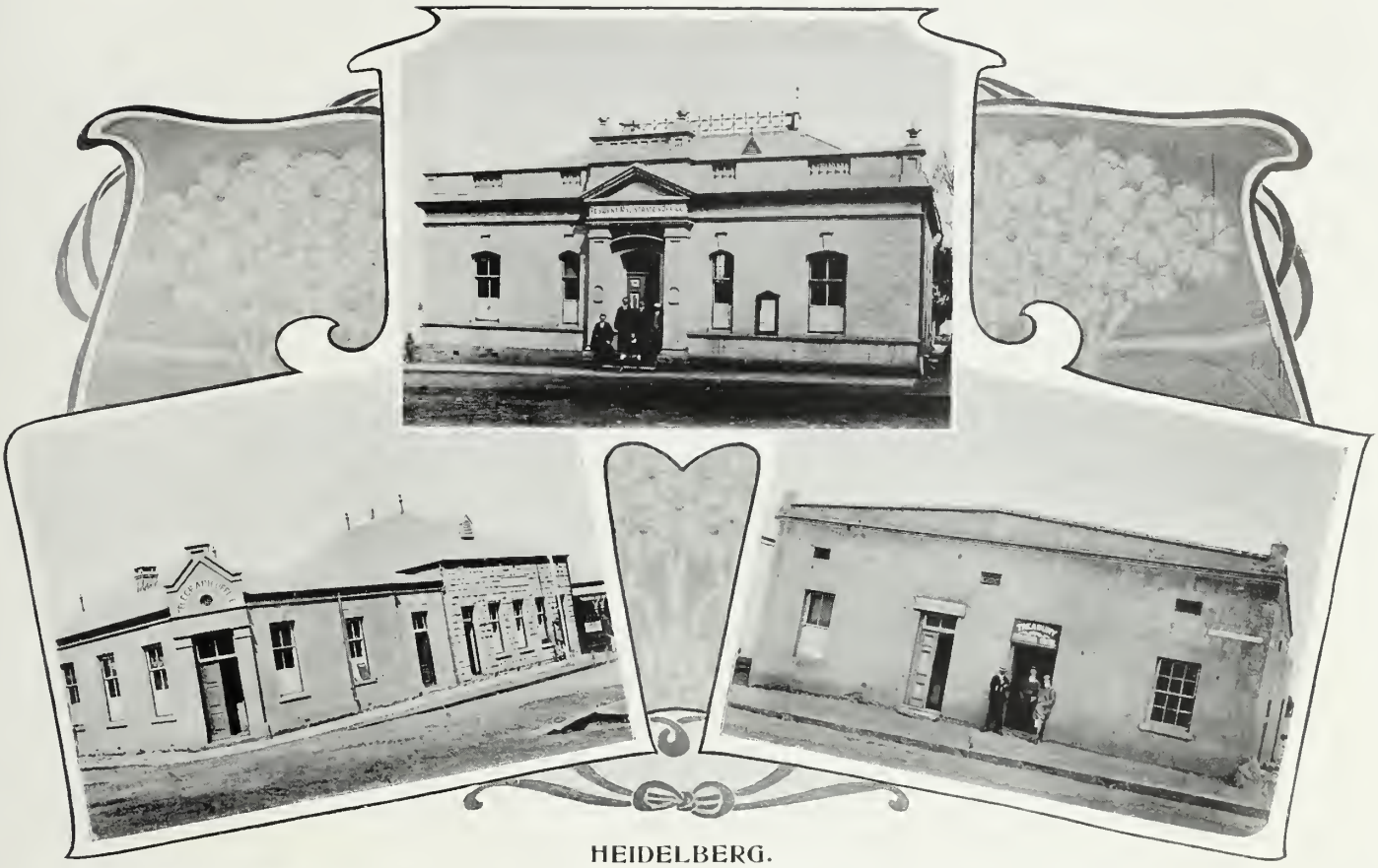
The town is generally supposed to be situated on the south-easterly corner of the Witwatersrand Basin, the curve of the reef pursuing a course from Heidelberg to the Nigel. It is an important centre of the gold-mining industry, and in the district the principal reefs being worked are the Nigel, Elsburg, and the Black Reef. Those discovered by the Coronation Syndicate were located to the south and south-east of the town, and if the prognostications of experts are confirmed should have a prosperous future. The district is rich in coal, but as an industry this has never been fostered. The results of volcanic action are noticeable in every direction, and the "fields" give evidence of this. Outcrops occur all round, while breaks in the strata have been detected in many places. With regard to agriculture,



Offices of the Standard Bank, Heidelberg.

Interior of Store of Mr. J. Reichenberg, Heidelberg.

Panoramic View of Heidelberg from the south-east.



HEIDELBERG.

I.—Resident Magistrate's Office. II.—Post and Telegraph Offices. III.—Treasury Office.

THE CORONATION HOTEL, HEIDELBERG.

very little can be said, as owners of farms are satisfied with the money they receive from option buyers.

Heidelberg was gazetted as a municipality in December, 1903, and has as its present Mayor Mr. A. von Gensan, J.P. The rateable value of property is approximately £600,000, and the Council have the power to levy taxes up to 3d. in the £. Public improvements are progressing on every hand, about 40 natives and a gang of prisoners being required to keep the roads in order. The other Councillors of Heidelberg Municipality are Dr. J. O'Reilly, Messrs. A. van Driel, R. H. Grantham, H. V. Carpendale, C. W. Apsey, L. Ohlsson, F. W. Driesselmann, with Mr. S. F. Peck as Town Clerk.

The Mayor is Mr. A. von Gensan, a native of Holland, who came to the Transvaal in 1891. After a twelve-months' stay in Johannesburg he started business in Heidelberg as notary public, conveyancer, and law agent. His re-election to the mayoralty is evidence of his popularity in the town where he has made his home.

Mr. J. REICHENBERG.

Mr. J. Reichenberg, Chairman of the Heidelberg Chamber of Commerce, started business as a general merchant there in 1892. The store is situated on a valuable site between the Standard and National Banks, opposite the Market Square. The premises cover a considerable space, and are stocked with one of the largest assortments in Heidelberg. The staple products of the district, such as wool, grain, mealies, and farm produce, are extensively purchased by this firm, which has taken a great interest in fostering the manufacture of butter by the farmers in the vicinity of the town. An agreement has been entered into by the firm, and the only separating creamery near town, to deal with their entire output. This step should encourage the advancement of the dairying industry in the district. Mr. Reichenberg is an importer of groceries, soft goods, ironmongery, furniture, building material, and produce of every description, and his business is regarded as one of the most progressive in the Heidelberg district.

The Dutch Reformed Church at Heidelberg.

THE CORONATION HOTEL.

Twenty years ago a diminutive building at the corner of Market and Pretorius-streets, Heidelberg, called the Waverley Hotel, was sufficient to accommodate the travellers passing through that town. When railway communication with Natal was established the town began to progress wonderfully, and gradually this hotel was re-built in sections, until to-day Mr. E. M. Grantham, the proprietor of the Coronation Hotel (which is the newer name), who has been in possession since 1903, has earned the reputation of carrying on a really first-class establishment. The accommodation and the *cuisine* are far above the average, and the wines, spirits, and cigars supplied are selected with discrimination. The hotel is situated in an elevated position overlooking the town, and is built after the style of many hotels in South Africa, the bedrooms being separate from the main structure. These are well-appointed and well furnished. The reading and smoking-room adjoins the dining hall in the front of the building, and is both cosy and well-fitted. After visiting the principal hotels in various parts of the Transvaal, the Coronation Hotel may be unhesitatingly pronounced as holding its own against similar establishments. Mr. Grantham, the proprietor, is an athlete of no mean ability, is a keen sportsman, and unquestionably makes a popular host. Those who care to take a run down to the pretty township of Heidelberg will find in Host Grantham's hotel every accommodation and convenience.

BUSINESS PREMISES OF MORGAN & DAWTREY, HEIDELBERG.

MESSRS. MORGAN & DAWTREY.

The extensive premises of this firm, at the corner of the Market Square and Church-street, Heidelberg, afford an attraction to the town. The business of drapers, outfitters, and furnishers carried on by Messrs. Morgan & Dawtrey was first established by Messrs. Duncan Mackenzie & Co. in 1901, and was taken over by the present firm in December, 1904. The trade is confined to Europeans, and being the centre of an agricultural and mining district it caters for the wants of those living within a wide area.

Mr. Morgan is descended from Welsh parentage, and was born in the Cape Colony. Mr. Dawtrey is a native of Sussex, England, by trade a draper, and supervises this section. Both the partners are practical men, and look after the business personally. The ladies' departments are attended to by smart and competent "hands." Millinery and dressmaking orders are executed on the premises. Outside of these lines a good business is carried on in firearms, the firm being agents for Field's sporting guns, &c.

The Market Square, Heidelberg.

Klerksdorp.

Klerksdorp, one of the principal towns of Western Transvaal, is pleasantly situated on the banks of the Schoonspruit, some nine miles distant from the Vaal River. It dates its existence as a modern Transvaal township from the period of the first Witwatersrand gold rush, although nearly fifty years prior to that there was a settlement and later a hamlet on the opposite side of the spruit to that occupied by the modern Klerksdorp, and where the Boers originally settled after crossing the Vaal in their northward trek. In 1886 the precious metal was discovered on the "town lands" of Klerksdorp, and the consequence was the influx of prospectors and gold-seekers. Two years later, in 1888 (while young Johannesburg was indulging in its first "boom"), the Republican Government laid out a mining township on the opposite side of the Schoonspruit to the original Klerksdorp settlement. Promising reefs were located in the district, and much interest was evinced in Klerksdorp properties, but the Witwatersrand propositions were more attractive, and the development of the Klerksdorp area and fulfilment of dreams of some of its ambitious prospectors were more or less "hung up." In 1897, nevertheless, the district of Klerksdorp recorded a gold output of 85,000 oz. More activity has been displayed, however, since the war. Numerous handsome buildings have been erected in the town, including the Government Buildings, hospital, post and telegraph offices, public library, in addition to several places of worship and private residences. Coal of good quality has been discovered in the district in large quantities, and diamonds have been found in the neighbourhood. Klerksdorp is 118 miles from Johannesburg by rail. During the war, the town, upon which the Boers had fallen back from Christiana, surrendered to the British forces under General Hunter in June, 1900. In 1903 it was created a municipality with twelve Councillors. On the banks of the Schoonspruit are very fertile lands, yielding good crops of cereals. Large crops of mealies are raised throughout the district, which is suitable for cattle raising, and for sheep and goats. The Klerksdorp municipal authorities have several improvements in contemplation and progress. A dam has been constructed across the Schoonspruit between the old and new townships, open ground near the dam being reserved as a public park. The climate is good; average rainfall per annum, 22 in. The development of railways means much for Klerksdorp. One connection is to Fourteen Streams, near Kimberley, on the Cape railway system; another is to Vierfontein coal mines, in the Orange River Colony. The earliest settlement on the site of old Klerksdorp is recorded about 1838, when the Boer *voortrekkers* established themselves on the Schoonspruit and diverted its waters for irrigation purposes. The population of Klerksdorp is shown in the census returns of 1904 as 3,201 whites, 532 coloured persons. The altitude of the township is 4,350 ft. above sea level. The township of Klerksdorp possesses one very good hotel—to which visitors may be confidently recommended—the Tivoli Hotel. The accommodation here is first-class. The quality of the food and other articles purveyed is satisfactory, and the terms, taking into consideration the usual hotel charges in the Transvaal, are reasonable.

J. A. Taylor & Co.'s Drapery Department.

Premises of J. A. Taylor & Co., Klerksdorp.

THE CHAMBER OF COMMERCE.

Klerksdorp Chamber of Commerce was first organised late in 1889, at a time when the depression which afterwards became a terrible "slump"

KLERKSDORP.

I.—View of Klerksdorp. II.—"Old Town." III.—Street in Klerksdorp. IV.—Railway Station.
V.—Pont on the Vaal River. VI.—Dutch Reformed Church. VII.—Hartebeestfontein, Klerksdorp District.

gave mercantile men leisure to look around them and discuss the business affairs of the town. The first business of importance undertaken was the endeavour to influence the Government of the Republic to construct a line of railway which would connect Kimberley with the Rand goldfields, and form the trunk line from the coast to the centre of the Transvaal goldfields. The Convention with the Free State, however, prevented this being done, and although the Chamber persistently agitated for the line it could not be obtained. The Chamber also did much valuable work in agitating for a line from Kroonstad to Klerksdorp, but with indifferent success, until a few months previous to the war, when the Free State Government itself undertook to build the line. Though devoting much time to railway concerns, the Chamber has consistently dealt with commercial matters: and, being the only public body existent in the absence of any municipal body, undertook much work of public utility not usually falling within the province of a commercial chamber. Mr. H. M. Guest, the original organiser of the Chamber, is president of the institution.

Mr. JOHANNES ADRIAN NESER.

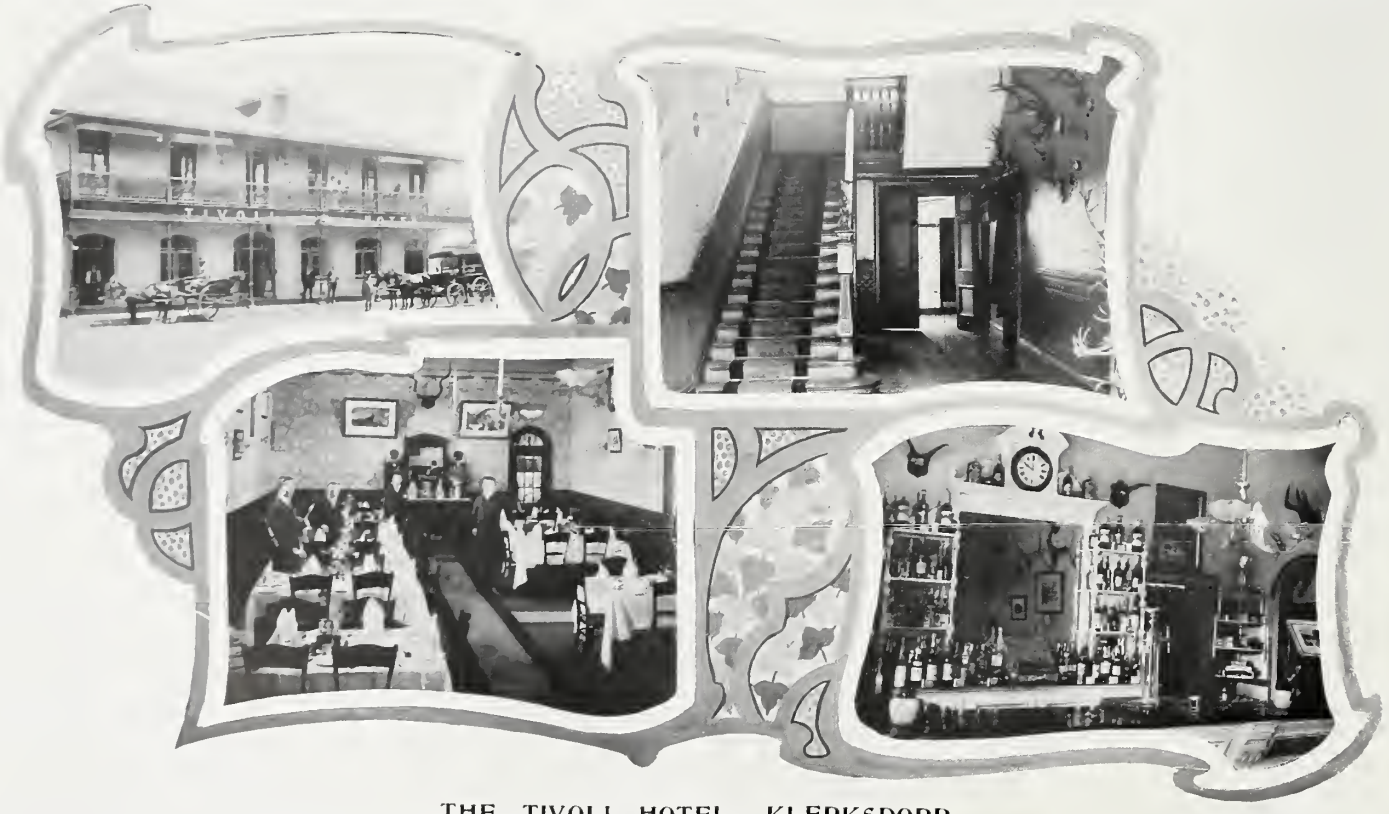
Mr. J. A. Neser, J.P. for the district of Potchefstroom, who was a member of the Inter-Colonial Irrigation Commission which sat in the Transvaal centres in 1905, is a native of Colesberg, Cape Colony. He qualified for his profession of attorney, notary, conveyancer, and sworn translator, in the Colony in 1884, and practised his profession in partnership with Mr. Slater till 1888, when he moved to the Transvaal, and settled in Klerksdorp, where he has established a very large practice, his business including that of auctioneer. Mr. Neser was naturalised in 1890, and became a full burgher of the Transvaal Republic in 1899. Mr. Neser was not in sympathy with the late war, but had to serve his Government, and did so as a commissariat officer, remaining on service until the occupation of Klerksdorp by the British forces. He was elected to the first Municipal Council in December, 1903, and has been re-appointed annually to the civic chair, which he occupied at the end of 1905. Mr. Neser has a branch business in Pretoria, under the style of Neser & Hopley. In Klerksdorp the firm has the agency for the Union-Castle Mail Steamship Co., Ltd. Mr. William Campbell is manager and accountant in the Klerksdorp offices. Mr. Campbell was born in the Cape Colony, of Scottish parentage. Mr. Neser is widely known and respected in the district of Klerksdorp, and is acknowledged to possess great ability. He is of marked individuality and natural courtesy. He has every faith in the prospects of the mining propositions of Klerksdorp district.

Mr. J. A. TAYLOR.

The subject of this notice was born in Potchefstroom, of Scottish parentage, and received his education at Aberdeen and St. Andrews, Fifeshire. He had also the advantage of nine or ten years' commercial training in Scotland. In 1890 Mr. Taylor returned to South Africa to establish himself in business as a general merchant, selecting Klerksdorp for his operations. He started in the "old town," but has now extensive premises facing the Market Square in the new township. The area of Mr. Taylor's business block comprises two stands 50 ft. by 50 ft. each, and the store is divided into five special departments. The firm are direct importers, and carry heavy stocks of general merchandise. The agency for Avery's agricultural implements is included in the business operations. Mr. Taylor was elected to the first Municipal Council of Klerksdorp, and is also a member of the local Chamber of Commerce, of which he has been chairman.

THE TIVOLI HOTEL.

Mention has already been made of the excellent accommodation avail-



THE TIVOLI HOTEL, KLERKSDORP.

I.—The Hotel. II.—The Entrance Hall. III.—The Dining-room. IV.—The Bar.

PANORAMIC VIEW OF THE WEST RAND CAPITAL KRUGERSDORP.

able at the Tivoli Hotel, in our article on "KLERKSDORP." This house, centrally situated, is quite an acquisition to the town. The front portion —a two-storey elevation with a wide verandah facing the principal business thoroughfare—has been re-built. It is of modern design, and is tastefully decorated. The entrance hall is hung with a fine collection of emblems of the chase, and presents an attractive introduction to the visitor, who cannot fail to be equally gratified with the appointments and furnishings of the room assigned to him. The drawing-room and other reception rooms of the Tivoli are in keeping with the *tout ensemble*, which is the embodiment of comfort. Altogether there are 35 double and single bed-chambers in the hotel, well lighted, newly furnished in walnut, and carpeted. The dining-room is sufficiently spacious to seat 100 persons, and is bright and cheerful. What is still more to the point, the *menu* at the hotel is attractive, the *cuisine* is excellent, and the wines and spirits stocked are of the very best. A private bar to the right of the hall is a cosy apartment. The billiard-room (32 ft. by 35 ft.) merits a special word of praise. It contains two excellent tables, one by Roberts, and a new one by Messrs. Burroughes & Watts, upon which the writer played the first game. As a lover of the cue he can fully testify to its good qualities. Here, again, the comfortable lounges afford the visitor who does not play an agreeable opportunity of witnessing the game. Hot and cold baths are handy to the bed-rooms and spacious sample rooms for commercial travellers are available. Among the patrons of the Tivoli Hotel have been the late High Commissioner for South Africa (Lord Milner) and other distinguished guests. The hotel is owned and managed by Mr. C. Manthey, who is ably assisted by Mrs. Manthey and by a competent staff of waiters and attendants. Mr. Manthey has been a resident of Klerksdorp for a period of 12 years. His recent costly additions to the hotel which he controls clearly show his confidence in the mining future of the surrounding district. The management of the Tivoli Hotel has the agency for coaches leaving Klerksdorp for the following places :—Wolmaransstad (40 miles distant), Bloemhof (94 miles), Christiana (34 miles), and Fourteen Streams (25 miles from Christiana), in Cape Colony.

Krugersdorp.

Krugersdorp, the principal town on the West Rand, is situated about 20 miles from Johannesburg. It dates back its existence to the year 1887—the period of the formation of the first camp on the Rand. At that time there was scarcely more than a small mining office where this well-laid-out township now stands. Its growth has been almost phenomenal. The streets are planned in blocks at right angles, the number of stands as shown on the official plan being approximately about 1,030. Krugersdorp is termed the capital of the West Rand—that portion of the country extending between the Roodepoort Mines and the Randfontein Estates, a distance of some 15 miles. The town was named after the late Mr. S. J. P. Kruger, President of the Transvaal Republic at the time it was founded. From the dorp of those days it has grown to large dimensions in proportion to the average townships of the Colony. It is likely to still further develop, as it is the centre of an important group of mines, of several industries in addition, and has promising agricultural resources. North of the town are spurs of the Rand range, while to the westward opens out a fine panorama of the lofty chain known as the Magaliesbergen. On the other side of these mountains is the low-lying semi-tropical district of Rustenburg. The average width of the streets of Krugersdorp is between 40 ft. and 70 ft., many of the thoroughfares being bordered with eucalyptus trees which have attained luxuriant growth. In this respect the township itself forms a pleasing contrast to the older portions of Johannesburg. The Market Square, a feature of all South African towns, measures in extent 750 ft. each way. Sales of produce and live stock are held here. In the centre of the square there is a bandstand which was erected in 1879 at the expense in about equal proportions of Dutch and English inhabitants, in commemoration of the Diamond Jubilee of Her Majesty the late Queen Victoria. The municipal authorities of Krugersdorp have been actively engaged in macadamising the roads traversing the township, and this work promises to be completed in advance of many other townships of the Colony. The civic fathers of this town recognise in this particular that they are creating a valuable and abiding asset. The suburb of Luipaard's Vlei is the favoured residential quarter of Krugersdorp, and Burger's Hoop township is another rising quarter. The district township, situated to the north of the town, is on a gentle eminence, within a few minutes' walk of the Market Square. Here the blocks into which the place is divided consist of six erven, each measuring 80 square yards (Dutch measurement). In the centre is the famous Paardekraal monument, of exceptional interest to the Transvaal. Its especial historic feature is that it was erected to commemorate the defeat of Dingaan's

The Government Buildings, Krugersdorp.

Zulu impis by the Boers. The date of that victory was kept up in after years in the Republic as a day of rejoicing, and is still retained on the statute books of the Transvaal Colony as a public holiday. At the spot where the well-built monument now stands the Boers assembled in 1880 and took an oath to throw off the British rule and re-assert their independence. It has been a nice compliment to the burghers of the late republic that the Government of the Transvaal Colony restored completely this monument, which was damaged by the British irregular forces during the campaign of 1899-1902. The origin of Burger's Hoop throws an important light on the parental regard of the late South African Republic towards the poorer burghers. This site was granted them by their Govern-

Town Council of Krugersdorp, 1904-5

ment to assist those who through misfortune or accident happened to be without property. The climate of Krugersdorp is excellent. Summer heat is tempered with frequent rains, and the nights are invariably cool and refreshing. In winter snow seldom falls, and ice is only found in thin layers. Several well-qualified medical men have settled in practice in the town. The population of the municipal area, as shown in the census return of 1904, was 19,483, made up as follows: Europeans, 6,657; aboriginal natives, 12,091; other coloured persons, 735. The total population of the district (of all races and colours) was 12,228. One cannot write even the briefest description of Krugersdorp and do it justice without further and special reference to its climate. Situated in sub-tropical latitudes, its elevation above sea level is 5,709 ft. A distinctive feature is the absence of damaging hailstorms. The winter months are delightful, with a still, dry atmosphere. There are no great extremes of heat and cold. It would be difficult in South Africa to find a better all-round climate than that of the West Rand. The township is administered by a Municipal Council which succeeded the Health Board constituted under the South African Republic, on the British occupation of the country in 1902. Much credit is due to the Council for the endeavours put forth to assist nature in preserving the general health of the place. The municipality has secured the services of an energetic town engineer and chief sanitary inspector, and the clean appearance of the town merits a word of praise for the manner in which these officials carry out their duties. There is also a good water supply. About eight miles distant there is to be found a series of caves. One of these recently discovered is of surpassing beauty. It is to be deplored, however, that natural phenomena such as these when first discovered should not pass under the control of Government, and so escape the defacement and destruction which often follows. There are some fine lime deposits in the district, the rights of working which have been obtained by a private company. Owing to some little disagreement between this company and the owners of the property with regard to the rights of exhibiting the caves, it is stated, their contents were destroyed and made into lime! The erection of a sanatorium at Krugersdorp is in view. With regard to the value of the West Rand as a health resort, the following may be quoted from some particulars dealing with the West Rand capital which were written by Mr. W. Gem, medical officer of health at Krugersdorp:—"The great feature of Krugersdorp is its low death-rate, and more especially from chest complaints. Cases of phthisis in its earlier stages or consolidation of the apices of the lungs do remarkably well, but when it has gone on to the cavernous stage it is highly undesirable for a medical man to send such patients out here, far away from home and friends and the luxuries of England. A few cases of cavernous phthisis have done well under various treatments, such as inhalations of creosote, guaiacol carb., eyllin, and other antiseptics, but such cases should not come out here, as the diet to be obtained is not suitable for them."

KRUGERSDORP CHAMBER OF COMMERCE.

The Chamber of Commerce, Krugersdorp, was inaugurated in 1902. It has an average of some thirty members. One of the principal questions to which its members have given attention is that of restricting local trading by Asiatics. The secretaries are Messrs. Welsford and Sheppard (an established Krugersdorp firm of mining agents, accountants, and financiers). The Chamber is affiliated with the Central Chamber of Commerce of South Africa.

LEGAL.

The legal profession is well represented in Krugersdorp. Among the most prominent practitioners of the West Rand township may be mentioned the firm of Mawby & Phillips, attorneys, notaries, and conveyancers. Mr. Edward Mawby, of this firm, re-opened his office as a legal practitioner in 1901, and was joined in partnership by Mr. Phillips in 1904. Mr. Phillips resigned his position as Resident Magistrate for this purpose. Mr. Mawby, who is a J.P. of the district, is a solicitor of the Cape Colony, and has 20 years' experience to his credit. He also was previously in the Civil Service, and was a magistrate. He comes from an old Colonial family settled in the Somerset East district. Mr. Phillips, who was admitted in England, arrived in the Transvaal in 1900, and entered the Civil Service. He occupies the position in Krugersdorp of Chairman of the

KRUGERSDORP.

I.—The Anglican Church. II.—The Roman Catholic Church. III.—The Dutch Reformed Church. IV.—Krugersdorp, like Johannesburg, has its Commissioner-street, here shown. V.—Market Square. The building with open tables in the centre is where the morning market is held. VI.—Monument-street, the earliest main thoroughfare. VII.—Ockerse-street, the present main business thoroughfare. VIII.—The Railway Station.

local branch of the Progressive Association. Messrs. Mawby & Phillips's offices are in the Market Square.

Mr. Mortimer Jooste, who practises in Krugersdorp, was the first admitted attorney of Transvaal birth. He is the son of the Rev. J. P. Jooste, formerly minister of the Dutch Reformed Church, Potchefstroom. Mr. Jooste was admitted in 1896, and commenced practice on his own account in Krugersdorp in 1902.

Mr. John Duckworth Reid, attorney-at-law, notary public, and conveyancer, is another prominent practitioner in Krugersdorp. He is a solicitor of the Cape Colony. Prior to establishing practice on his own account in 1905 he was a partner in the firm of Mawby & Phillips.

CARNEGIE & JAMIESON'S FOUNDRY, KRUGERSDORP.

Mr. H. C. TANNER.

Mr. Harold Chas. Tanner, who held the office of Mayor of Krugersdorp in 1905, is a native of Stroud (Gloucestershire), England. He served his apprenticeship in London, in the outfitting business. In 1889 he emigrated to South Africa, and for some years subsequently was engaged as assistant in various establishments in Capetown, Pretoria, and Johannesburg. Profiting by the experience gained in this capacity, and when his opportunity came, Mr. Tanner commenced business on his own account in the West Rand township in the year 1897, entering into partnership with Mr. Geo. Harper. The firm has since conducted a successful concern, the only break being during the period of hostilities, when business operations had to be temporarily suspended. In 1903 Mr. Tanner was appointed a member of the first elective Town Council of Krugersdorp, for a term of three years, and in his second year of office he was placed in the civic chair. Mr. Tanner was chairman of the Krugersdorp Chamber of Commerce in 1902-3-4, and in 1905 he was vice-chairman and member of the Committee. As a townsman he has displayed ability in the interest evinced by him in local affairs, and has thereby won the goodwill and appreciation of the inhabitants of Krugersdorp.

Messrs. CARNEGIE & JAMIESON.

The firm of Carnegie & Jamieson, of the West Rand Foundry, Krugersdorp, was established in 1897, and from small beginnings has developed a considerable industry. The present extensive foundry is in President-street, and covers an area of six stands. The largest brass and bronze castings that have been made on the Rand have been executed here. The average number of skilled artizans employed is 25. A special feature of Messrs. Carnegie & Jamieson's business is that they are founders solely, and do not extend their operations to the engineering branch. Mr. T. Jamieson, the head of the business, lost his partner by death some months ago. A native of Glasgow, where he had thorough training in various branches of engineering work, Mr. Jamieson has devoted considerable energy and skill in developing his present business into the well-equipped establishment which he now supervises. He arrived in the Transvaal in 1896. The firm does a considerable amount of work for the mines, and has undertaken important orders in large castings for several of the principal properties. The West Rand Iron and Brass Foundry from its inception supplied a want, and practical supervision and energy have been infused in its development to the position it now occupies among the industries of the Rand.

Mr. W. MOORCROFT EDWARDS.

Mr. W. M. Edwards, who represented No. 1 Ward in the municipality of Krugersdorp in 1905, is a native of Cape Colony, and grandson of one of the pioneers of the Transvaal, who went through the Natal troubles with the Boers, was a great friend of General Retief (murdered by the Zulu chief Dingaan), and was afterwards present at the battle of Blood River. He arrived in the Transvaal in 1867, and settled in Potchefstroom. Some years later he visited Matabeleland in the interests of the London and Limpopo Company, and procured a concession of the Tati territory from the Matabele chief Mozelekiese. Mr. Edwards went south to the Diamond Fields at the time when the first rush to the river diggings set in, and was among the first to the Kimberley diamond rush, about 35 years ago. He left Kimberley on the finding of "blue ground," thinking the fields were worked out. The prevalent opinion at that time was that when blue ground was struck it was useless prospecting further for the precious stones. Now, of course, the surface diamonds are only looked upon as an indication, and if prospectors are successful in discovering a true blue ground pipe below, a mine is likely to be unearthed which has every prospect of permaneney. Mr. Edwards returned to the Transvaal, and went to Pilgrim's Rest goldfield, Lydenburg district. He afterwards proceeded again to Potchefstroom, where he entered upon a commercial career. He gave this up, and went down country to the Cape Colony at the time of Shepstone's annexations in the latter seventies. He took part in the Kafir wars of the Old Colony, and was second in command under Field-Commandant Grey, who had raised an irregular corps against the natives. It was Mr. Edwards who captured the noted Pondomese chief Umdusna on the Teste River. Mr. W. M. Edwards married the daughter of Commandant Grey, and the following years of his life were spent in farming in the Cape Colony. The opening up of the Witwatersrand attracted him to the Transvaal again, and he was amongst the early Rand pioneers. He was a member of the first Diggers' Committee on the West Rand, and remained on that Committee until it was wrecked by the Chamber of Mines. Mr. Edwards bought a portion of the farm Luipaard's Vlei, and settled in Krugersdorp, where he still resides. He claims to have been the first farmer in the Transvaal to carry out experiments with English fruit trees. He first imported a small quantity for his farm. In 1905 his grafted trees numbered no fewer than 2,000, the varieties embodying cherries, nectarines, pears, apples, plums, and walnuts. The fruit produced by these trees is as fine as can be procured in any part of the world, and commands a good market.

The Grand Hotel, Krugersdorp.

Mr. Edwards was the first to start a Farmers' Association in the Transvaal, on the lines of similar associations in the various districts of the older Colonies. For the last two years he has been present as delegate at the Central Farmers' Association of the Transvaal, which is now becoming a most successful institution. In 1905 he occupied the position of chairman and manager of the Krugersdorp Board of Executors, which was founded by him. He is the owner of a considerable amount of land through-

Entrance Hall, Grand Hotel, Krugersdorp.

II

III

IV

V

VI

MESSRS. HARPER & TANNER.

I.—Premises at Roodepoort. II.—Premises at Randfontein. III.—Boot and Shoe Department, Krugersdorp. IV.—Gentlemen's Clothing Department, Krugersdorp. V.—Outfitting and General Department, Krugersdorp. VI.—Exterior of the Business Premises, Ocherse street, Krugersdorp.

out the country. Mr. Edwards took part as a burgher of the Republic in the late war, and was a member of General Botha's staff. He was commandant of the scouts known as Edwards's Scouts. He was wounded at the battle of Spionkop.

THE GRAND HOTEL.

One of the first questions put by a prospective traveller to a town is "What sort of hotels have they?" This query cannot always be satisfactorily met, although twenty years has seen a vast change for the better in the generality of South African accommodation. The establishment under notice — the Grand Hotel, Krugersdorp—has attained a reputation for comfort and good attendance justly merited in the eyes of the travelling public. The proprietor of the Grand, Mr. J. Betz, is tacitly acknowledged to be an experienced and courteous host. His hotel is equipped on modern lines, and is excellently managed. The appointments throughout combine elegance and convenience. The building contains a spacious dining-room capable of seating 150 persons. On the ground floor also, leading from the hallway, which is entered from Ocherse-street, are well-fitted smoking room, billiard room, and bar. On the upper floor the bedrooms are furnished with good taste and in comfortable style, and bathrooms are available (on either floor) where hot and cold water may be had. The service throughout in the hotel is of the best, and has the advantage of personal supervision by a proprietor who spares no trouble to make his guests' comfort something more than a theory. Mr. Betz, who has had many years' experience of hotel management, has the enviable reputation of being an ideal host—which is a testimony not only to his own personal capabilities, but also to the premier reputation of the Grand Hotel. A good table is not the least of the attractions which help towards this consummation.

MESSRS. HARPER & TANNER.

The business conducted by Messrs. Harper & Tanner, in premises in Ocherse-street, Krugersdorp, was founded in 1897. The establishment is centrally situated, and includes two shops, having together a frontage of 50 ft. The energetic principals have attained a valued reputation as up-to-date outfitters and general clothiers. Stocks kept appear to be carefully selected, and are certainly well arranged, there being apparent a close attention to detail which in any business forms one of the secrets of success. In the larger store is the outfitting department. In addition to the general articles of gentlemen's attire, ready-made suits of fashionable cut may here be obtained, a speciality being made of English tailor-made suits to order. The other store is devoted to a comprehensive variety of footwear for men, women, and children. This department has gained popularity on account of good quality and moderate charges. Messrs. Harper & Tanner import all their goods direct from the best English, continental, and American manufacturers, and therefore can give the advantage of wide range in selection of whatever is required. Branches of the business have been established at Roodepoort and Randfontein, where in addition to the merchandise previously mentioned well-selected stocks of drapery and furniture are kept. Each branch is supervised by an experienced manager. Messrs. Harper & Tanner's business is evidently making deserved headway. With the development of the district of which Krugersdorp is the centre, the firm may reasonably hope for a much larger sphere of operations under such

Premises of Harvey, Greenacre & Co., Ocherse-street, Krugersdorp.

enterprising and capable management. Mr. H. C. Tanner, who has been a member of the Town Council since its inception, was Mayor of Krugersdorp during 1905. His partner, Mr. G. Harper, who is commanding officer of the local company of the Transvaal Scottish, has always taken a keen and abiding interest in volunteering.

Exterior of G. Norton's Establishment, Krugersdorp.

Messrs. HARVEY, GREENACRE & CO.

The advance made by the township of Krugersdorp and its future prospects encouraged the well-known Durban firm of Harvey, Greenacre & Co. to establish a branch there in 1895, which business is conducted directly under the control of the main establishment in the Natal seaport town. The Krugersdorp business is under the management of Mr. D. Hull, a native of Natal, who has been for twenty years in the firm's employ. The premises in which this firm first started business in the West Rand township were enlarged and improved as the district developed, and were ready for occupation in November, 1904. This very handsome store at the corner of Market and Ochorse-streets has frontage of 50 ft. by 60 ft. The buildings have an imposing frontage, and the stock includes drapery, millinery, dress materials, gentlemen's outfitting, general boot and shoe department, and household furnishings. In each department the stocks are very large, of superior quality, and are well displayed. Messrs. Harvey, Greenacre & Co.'s establishment is undoubtedly one of the most complete on the West Rand. From inquiries made as to prices ruling it was evident that they compare favourably with those obtaining in Johannesburg and other centres. Such an establishment, in which better-class goods can be purchased, must be a distinct advantage to the farming, mining, and general community of the district of Krugersdorp. The manager and the staff generally appear to be very attentive and obliging. Messrs. Harvey, Greenacre & Co.'s premises form a really handsome block, with very fine plate-glass windows, giving an advantage in the adequate display of the goods kept by the firm in its various departments. Mr. Hull, manager, is a member of the Krugersdorp Chamber of Commerce.

Mr. GEORGE NORTON.

The bakery business controlled by Mr. George Norton is one of the largest in Krugersdorp, and is also the oldest establishment in this line in the town. Mr. Norton was the contractor for military bread supplies during the last 18 months of the war. As will be seen from one of our illustrations, this was no mean undertaking. The plate shows a military bread issue of 1,700 loaves on a transport wagon, this being only a portion of the daily contract of 8,000 loaves. Mr. Norton's premises are situated on the Market Square. He keeps two delivery carts employed, and in addition to the bread bakery is a wholesale confectioner. Mr. Norton is also chief proprietor of the British Blue and White Lime Company's works, which are situated on the farm Uiskomst, about 16 miles from Krugersdorp. The average output of this Company is some 2,000 bags per month. Mr. Norton is a native of Norfolk, England, has been 10 years in the Transvaal, and started business on his own account in the beginning of 1901.

A Military Bread issue during the war from G. Norton's Bakery, Krugersdorp.

Mr. JOSEPH SEEHOFF.

One of the best known public men of Krugersdorp is Mr. Joseph Seehoff. He is a native of Hanover, and became associated with the West Rand township in 1889, shortly after his arrival in South Africa. Mr. Seehoff is a member of the firm of Seehoff & Victor, who have a premier position as wholesale produce merchants. The partnership was entered upon in 1893. Mr. Victor, who was an old schoolfellow with his partner, came to this country with Mr. Seehoff. The business acquired the Kromdraai Lime Works, which since their first equipment by the firm have attained a reputation for good qualities of white and blue lime. Mr. Seehoff was elected to the first Municipal Council in Krugersdorp. He has during a public career taken keen interest in the welfare of the town, and was (prior to the municipalisation of the town) a member of the Health Board under the Republican Government. At the commencement of the municipal year 1905-6 Mr. Seehoff was elected Mayor. He is a member of the Chamber of Commerce. The lime works owned by Seehoff & Victor are situated about eight miles from Krugersdorp. The works are well equipped, and sales of the lime have rapidly developed under capable management and the skilful treatment of the useful product dealt with. Of the limes burnt and placed on the market, the blue lime is used for building purposes; the white lime finds its way to the mines, and is employed in the cyanide processes.

Messrs. SOWDEN & STODDART.

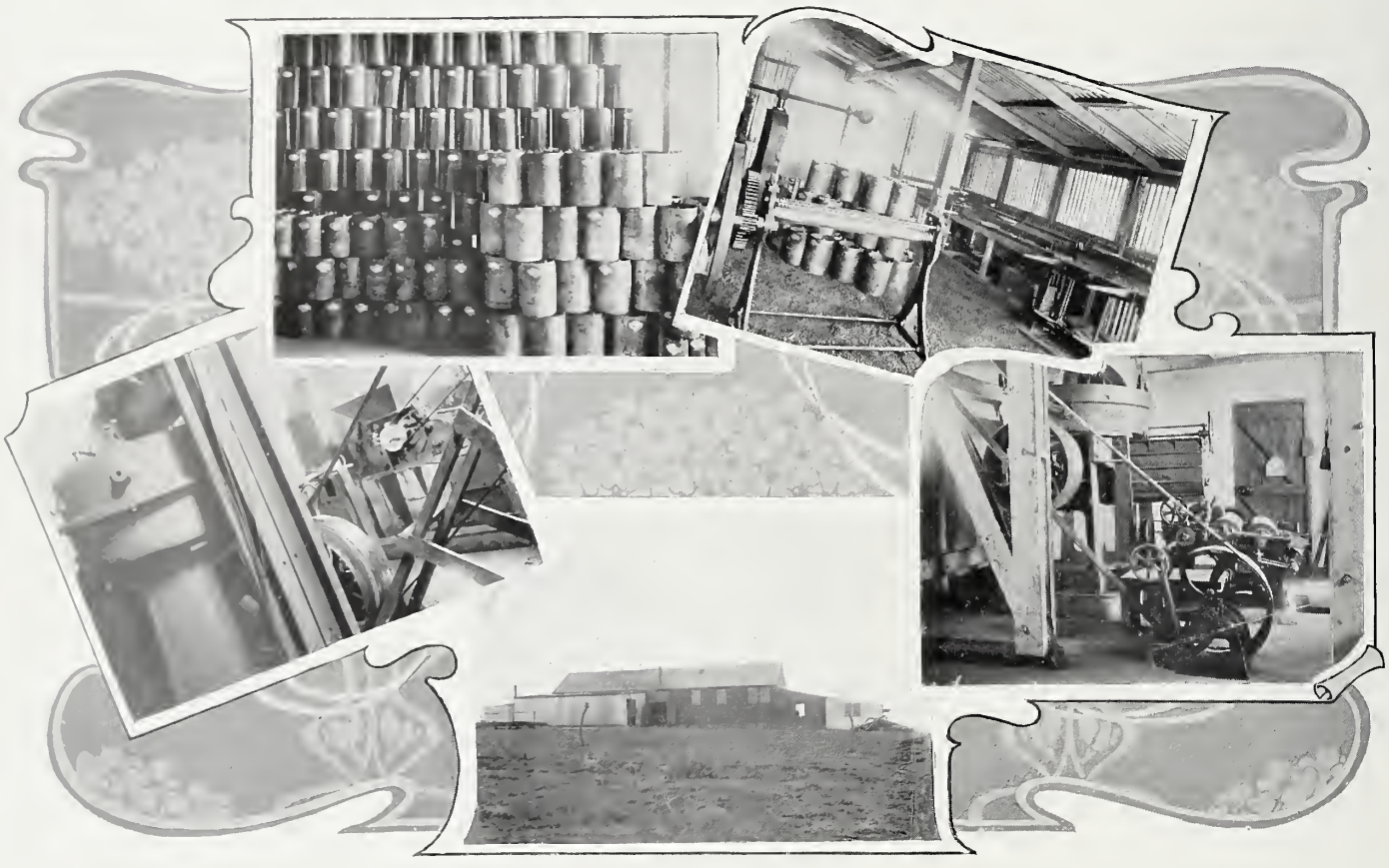
One of the branches of the important firm of Sowden & Stoddart, drapers and clothiers, is situated in Human-street, Krugersdorp. A distinct feature of this business is that fresh goods arrive by every mail, and are displayed in showrooms which are superior to the general establishments of the West Rand. The branch was established in Krugersdorp in 1902, and newer premises in which the firm's business is carried on were opened two years later. The manager is Mr. C. W. Meredith, who joined the firm's employ in 1895. The frontage of the store is 50 ft. to the main street, and the showrooms display a well-assorted selection of ladies' mercery, boots and shoes, fancy goods, and furniture in great variety. The trade conducted by Messrs. Sowden & Stoddart extends throughout the district. The parcel order department is a distinct feature, and is personally attended to by the energetic manager. A speciality of the business is the latest novelties from London and Paris. The staff of buyers in London is under the direct supervision of Mr. Stoddart. The firm has trade connections all over the Cape Colony, the Orange River Colony, and the Transvaal.

Premises of Seehoff & Victor, Krugersdorp.

Business Premises of Sowden & Stoddart, at Krugersdorp.

THE TRANSVAAL PAINT AND COLOUR MANUFACTURING CO., LTD.

The natural resources of the Transvaal seem to be unlimited, and the discovery of natural earth clays, from which paints and dry colours, equal in quality to any produced in other parts of the world, may be manufactured, heralds the introduction in the Colony of an important and lucrative industry. These clay lands are situated at Elandsvlei, about eight miles from Krugersdorp along the Rustenburg road, but the value of the deposits on this and the adjacent farms appears to have been entirely overlooked until quite recent times. The pigments discovered to be present in the soil are oxide of iron, golden ochre, sienna, umber, vandyke brown, and Indian and Venetian reds. About 25 acres of the property have been prospected, shafts to the depth of 30 ft. having been sunk, and beds of hematite, or red oxide of iron, have been found to extend over some 15 acres. There are deposits of red sienna; and on the adjoining farm large extents of ochre, particularly golden ochre, have been found to exist along a ridge for a distance of upwards of a mile, and to a depth of 80 ft. These ochres are of a very fine quality. The deposits have been taken up and are being worked by the Transvaal Paint and Colour Manufacturing Company, Ltd. The machinery used at the Company's works is of the most up-to-date description. The complete plant has a producing capacity of 14 tons of finished material per diem. After quarrying, the crude oxide of iron is received in a disintegrator, working at the rate of 2,500 revolutions to the minute, and is discharged in impalpable powder, to be ground with oil to a paste, or, by another process, to be passed through a dressing machine to make dry powdered oxide. The crude golden ochre, umber, and vandyke brown, after being mined and quarried, goes through a stone mill, preparatory to being blended and tinted. This mill, a Torrence plant, and another mill, have a combined output of eight tons per day. The Torrence oil-grinding mills turn out six tons per day. No oils being produced in the Transvaal, all oil required in the paint works has to be imported from Europe in hogsheads. The finished product is conveyed in troughs to the packing room, where it is weighed in the kegs, made on the premises, a special and complete plant having been installed for this branch of the work. Another special line is that for producing chemically manufactured colours, which should be a point of great interest to the chemical industry of the Transvaal. The Transvaal Paint and Colour



WORKS OF THE TRANSVAAL PAINT AND COLOUR MANUFACTURING COMPANY, LIMITED, ELANDSVLEI, near KRUGERSDORP.

Manufacturing Co. started with a nominal capital of £8,000, and had to face serious discouragement, loss, and difficulty. It is therefore the more to their credit that the industry has been placed successfully on a working footing. The works at Elandsvlei were formally declared open on September 30th, 1905, by Colonel Bottomley, of the Mines Department of the Transvaal Government, and the ceremony was the occasion of a very successful social function. The management claims that the product of the industry can compete advantageously with the imported article, as paint and colour material will be produced at a saving of from 10 to 15 per cent. in cost; that it can turn out any coloured paint producible in the world; and that both the industry and the works are capable of infinite expansion. The Chairman of the Board of Directors is Mr. Geard; Mr. Titheridge is the works manager, and Mr. Dodds has been appointed sole agent of the Company for the Transvaal and the Orange River Colony. These gentlemen are in the position of having established a new and valuable industry, which will probably play an important part in the development and commercial prosperity of the Colony.

Leydsdorp.

In the picturesque Low Country, where fever is more or less rife, and west of the Bushveld regions, lies the mining camp of Leydsdorp, one of the points of departure for the Zoutpansberg gold fields. The township is situated on the southern slopes of the Murchison Range, in a direct northerly line from Lydenburg and west of Pietersburg and Agatha. The last-mentioned town is of some importance, being the centre of the rich agricultural district adjacent to the Zoutpansberg fields. Leydsdorp stands on a proclaimed mining area, and has neither Municipal Council or other local governing body. It contains but few dwelling-houses, and has a scanty population. The climate is somewhat unhealthy, fever of a malignant type being prevalent about the Murchison Range. Miners in this district receive wages double those paid on the Witwatersrand. Leydsdorp is reached by post cart, the railway not having yet penetrated into this part of the Transvaal. The town will, however, be one of the stations on the projected line which is to open up the eastern and north-eastern provinces of the Colony, and connect with Pretoria and Delagoa Bay. Mining and prospecting, with intermittent periods of feverish excitement and activity, are carried on in the Zoutpansberg gold fields, and make such prosperity as Leydsdorp enjoys. The surrounding country is mountainous and of great beauty, being well watered and thickly covered with magnificent forest growth. It is difficult of access, and dangerous to explorers, owing to the absence of roads and landmarks. In the neighbourhood of Leydsdorp there are tales afloat concerning "hidden treasure" of various descriptions, many of which stories receive ready credence, some having connection with the Boer Government, others, again, woven around the romance attaching to the native "queen" Modjatje, while still others are more imaginative and fabulous. Expeditions have started to recover these fabled hoards, and in connection with the latest of these search parties, organised since the war of 1899-1902, a gruesome tragedy, resulting in a murder trial and an execution, was the outcome. With the extension of railway systems and closer connection with other centres, it may be expected that the probable development of the country around will increase the importance of Leydsdorp.

Lichtenburg.

Lichtenburg, situated 36 miles from Mafeking and 70 miles from Potchefstroom, was established as a township in 1893 on the farm originally owned by Hendrick Adriaan Graaff, who sold the place to a syndicate of five members who laid out the township, which then formed part of the district of Marico. It was portion of the disputed tract of land known as the "key to wall," and it was not until after the 1881 war that the boundary line was computed, which then rendered it indisputably the property of the Transvaal Government. In 1886 it was made a district of its own under the title of the district of Lichtenburg. In conformity with the London Convention of 1884, which considerably altered that of 1881, a large number of farms to the extent of some 45 were added. The district now contains altogether 400 farms, of which Lichtenburg is the centre. Its products are principally grain, tobacco, and general root crops.

Mr. E. H. Matthews, Lichtenburg.

The irrigation of the farms is mostly from boreholes, there being no actual stream or spruit of sufficient importance to serve this purpose. The rateable value of the town is £74,850, and the commonage comprises 11,285 morgen. The following is the approximated statistical information concerning the township and district: White inhabitants 1,200 and natives 150 in the former, and whites 6,300 and natives 9,880 in the latter. Cattle, 2,300 head, goats and sheep 140,000, horses and mules 1,000, donkeys 500. The estimated area under cultivation is 19,000 acres, on which the crops are maize and kaffircorn. This area has been computed to have realised 120,000 bags for the season 1905-6. The available land for cultivation is estimated to be 3,200,000 acres. The yield at present is from five to 12 bags, or an average of 8½ bags per acre. There are about 800 under wheat and barley, the average yield being 15 bushels per acre. A feature of the district is that there is no disease, and in the dry season it is eminently suited for stock-raising. The value of farmland is about 12s. 6d. per morgen. Labour, whilst not plentiful, is usually sufficient for all agricultural requirements. The average wage ruling for native farm labourers is from £1 to £2 per month, but a system also exists of the farmer ploughing and paying the hut-tax for the Kaffir, and in addition

a small monthly cash payment in return for the labour contributed. The possibilities for the future development of Lichtenburg will be seen from the above figures to be considerable, and when a little more energy is shown by the present resident farmers or newcomers, this district should form one of the most important assets of the Transvaal.

Mr. EDWARD HENRY MATTHEWS.

Mr. Edward Henry Matthews, Chairman of the Lichtenburg Municipal Council in 1906, first arrived in the district in 1893 from Colesberg, Cape Colony. He was formerly acting as clerk in the Civil Service, whilst his father was Commissioner for the district. He has been practising as law agent since 1887, and both owns and represents considerable property in the township and district. Since the municipalisation of the township he has continuously occupied the chair. He is a prominent personality in Lichtenburg, where he has for so many years occupied a foremost position.

Mr. GUSTAV ANDERHOLD.

Mr. Gustav Anderhold, who purchased the business of Messrs. Duffield & Co. some time since, prior to which he acted as manager for about ten years, is a native of Cape Colony, and settled in Lichtenburg in 1889. The business, which has attained very large proportions, carries, in addition to a general mercantile stock, building material, and agricultural implements of all descriptions. The firm acts as the local outlet for a considerable portion of the grain products of the district, and has proved a great support to the farmers in those years when the crops have not reached expectations, owing to drought or other causes. The firm imports direct, and procures stock from all the best markets. Owing to the increase of business, considerable alterations are being made to the premises, which will add greatly to the comfort and convenience of clients. The stock held by this firm is of a large and comprehensive character. It is of interest to record that this was the first business started in Lichtenburg.

THE INTERNATIONAL HOTEL.

The International Hotel, Lichtenburg, facing the Market Square, is the favourite house of entertainment for the residents of the surrounding districts. The building covers a large area. The stoep in front is separated from the footpath by a garden, the foliage from which affords excellent protection and shade. The accommodation comprises a number of comfortably appointed bedrooms,

STREET IN LICHTENBURG.

sitting, billiard and bath rooms, and very commodious stabling. The business, which is owned by Mr. E. Platnauer of Roodegrond, is under capable management. Every care has been taken in the selection of the wines, spirits, and cigars stocked, and the table is fully up to, if not better than, the usual standard of first-class hotels in the country districts of the Colony. The house enjoys a good business, and is in excellent repute with the travelling public.

Lydenburg.

The district of Lydenburg, situated in the east of the Transvaal, and bordering on Portuguese territory, comprises an area of 9,868 square miles, 2,720 of which consist of Crown lands. The principal towns are Lydenburg, the capital; Pilgrim's Rest (the centre of the Lydenburg Gold Fields), Dullstroom, Wemmershoek, and Belfast (on the Pretoria-Delagoa railway line). The first *voortrekkers* who explored the district entered it through Sekukuni's Country, and by way of the Magnet Heights road. Following the Steelpoort River, they reached a spot upon which they established the town of Ohrigstad, about 33 miles north of the present capital, and on a river of the same name, flowing north into the Blyde River. The origin of the name Ohrigstad has received various explanations, the most satisfactory being that it was called after one Ohrig, a citizen of Amsterdam, Holland, who endeavoured to open up trade from Delagoa Bay with the *voortrekkers*. The town was founded in the year 1845, but after a few years' residence in the valley of the Ohrigstad, during which the ravages of fever seriously thinned their ranks, the sturdy *voortrekkers* moved out to the higher ground, and founded, about the end of 1849 or early in 1850, the town of New Ohrigstad, subsequently known as Lydenburg, on a tributary of the Spekboom River. The word Lydenburg signifies "Town of Weeping, or Sorrow," and is supposed to have been suggested by the grief of the settlers at having lost so many of their number by fever in the Ohrigstad Valley. About this time—between August, 1849, and February, 1850—the emigrants declared the district a republic, under the name of the Lydenburg Republic. The first reference to the town in the Government archives is contained in a Volksraad resolution of July 4th, 1855. The district remained a separate republic until 1859, when it was incorporated with the South African Republic, it being decided that the archives should remain in Lydenburg. They were, however, removed later to Pretoria, and ultimately lost. The district and town, being far removed from civilisation, might have remained for many years an almost unknown quantity in the vast wilderness of this part of the Transvaal, but for the discovery of gold, which, like a magician's wand, completely altered the economic outlook. The first scientific traveller to visit the district appears to have been the German explorer Herr Mauch, who travelled to Lydenburg on foot, from Pretoria, in 1868. He apparently did not reach the site of the present Fields, or if he did, he failed to recognise its possibilities, but he marked a spot about 70 miles N.N.E. of Lydenburg, in (approximately) 24° 10′ S. Lat., 31° 50′ E. Long., which he considered highly auriferous. This would be somewhere a little to the south of the present village of Leydsdorp. It is doubtful to whom the actual discovery of the Lydenburg Gold Fields may be attributed. Mr. E. Button, the son of a well-known Natal colonist, reached Lydenburg in July, 1869. Though he did not prospect the district, he at once proceeded north towards the Zoutpansberg, accompanied by two miners, and Mr. Tom McLachlan. In June, 1870, Mr. Button and a companion made another trip to the district, visiting the spot marked on Herr Mauch's map as a likely place to find gold. Their search was unsuccessful, however, so they again proceeded north. Many others visited the district about this time, travellers, miners, and prospectors, urged thereto by the numerous reports of the existence of payable gold, but no reliable discovery was made. In 1872, another visitor, Mr. C. T. Osborne, traversed the country between Pretoria and Delagoa Bay, and expressed an opinion that on the eastern slopes of the Drakensberg, near Lydenburg, gold existed over a considerable area. The neighbourhood indicated by him is probably that of Sabi and Ross Hill. Messrs. McLachlan, Button, & Parsons were unquestionably amongst the first and most prominent to give an impulse to the steady search for a payable field in those early days; but still reports of a most conflicting nature continued to excite or depress the public hopes. At last, in February, 1873, news was officially received in Pretoria that Messrs. McLachlan & Valentine had notified to the Landdrost of Lyden-

MR. ANDERHOLD'S STORE, LICHTENBURG.

burg the discovery of alluvial gold 36 miles to the east of Lydenburg, and claimed the reward offered by Government, if it should prove to be a payable field. The spot indicated was in the neighbourhood of Spitzkop, probably on the farm Hendriksdal, now generally known as Ross Hill. From this time forward, the success, in a greater or less degree, of the Lydenburg Gold Fields became assured. On April 2nd, 1873, the Postmaster-General of the Transvaal Republic received a parcel containing 2½ ozs. of alluvial gold from the Landdrost of Lydenburg, which the latter had himself found, on Hendriksdal. Month after month the pioneers applied themselves energetically to their work, now elated by success, anon depressed by fruitless labour, and the precarious supply of even the barest necessities of life, yet no actual payable field was discovered. Subsequently a number of diggers left Spitzkop, and proceeded to McLachlan's farm Geelhoutboom, lying about 20 miles to the north. There they found nearly two miles of the creek already pegged out. In September, 1873, a miner, William Trafford, who had been prospecting on the Blyde River, some 12 or 14 miles to the north, reported the discovery of payable gold in a valley at the headwaters of one of the tributaries. The diggings, which, with a township, were ultimately established here, were called Pilgrim's Rest. The field of operations extended for about five miles along the creek. Excellent prospects were soon found here, and in the higher terrace-land in the vicinity; but the real richness of the creek had yet to be ascertained. The water supply was good. The Gold Commissioner visited the place, issued licenees, and established a police force. Gold soon became sufficiently plentiful to be recognised as a circulating medium, at the rate of £3 15s. per oz. Ultimately Mr. Burgers, President of the Republic, visited the fields, and sanctioned the general name of "New Caledonia" for the area, the diggings on McLachlan's farm Geelhoutboom being officially named McMc, or "MacMac." A grant of £1,000 was authorised for the construction of a road to Lourenço Marques. During September of the year of discovery, two large nuggets, amongst others, were found. One, called the "Emma," weighed 1 lb. 4½ ozs.; the other, the "Adeliza," weighed 1 lb. 10 ozs. 17½ dwts. These nuggets were purchased by President Burgers. Subsequently other nuggets varying from 20 ozs. to 4 lbs. and 6 lbs. weight were also reported. Various parcels of gold, weighing from 15 lbs. to 21 lbs., were sent to Pretoria. One party of diggers, about December, 1873, found 13 lbs. 8 ozs. weight of nuggets in one day, and several ounces on the two following days. In February, 1874, the R.M.S. *Basuto* took to England

LAST COACH LEAVING LYDENBURG ON OUTBREAK OF HOSTILITIES, 1899.

14 lbs. weight of Lydenburg gold, and another parcel containing 25 lbs. 11 dwts. (including an 8½ oz. nugget) was received in Capetown. On April 18th, a nugget of 1 lb. 7 ozs. and another of 1 lb. were found as the result of one day's sluicing. Claims at this time were valued at from £40 to £300 each, according to the site. While Pilgrim's Rest was thus becoming established, prospectors were at work all over the country, and on March 18th, 1874, a payable field was proclaimed on Waterfall Creek, a few miles from Pilgrim's Rest. One Nolan was the original discoverer, and at the time of the proclamation there were from 60 to 70 diggers at work there. A small quantity of gold was even found on the Lydenburg town lands. The Government interfered but little, merely appointing a Gold Commissioner, who, with the Diggers' Committee, was empowered to frame the necessary laws, to be afterwards confirmed by the Volksraad. The timber required on the diggings was obtained from the neighbouring natural forests, the diggers paying six planks for each lot of 40 supplied. The current value of these planks was 15s. each. In 1874 there were approximately 1,000 individual diggers working on the Lydenburg Fields. In comparison with the state of affairs on the early goldfields of Australia and California, however, there was an almost complete absence of serious crime, and though on a few rare occasions the services of "Judge Lynch" are said to have been exercised, the community on the whole was peaceable and well behaved. Such, in brief, is the early history of these fields, and it is unfortunate that it should have to be chronicled that these were their palmiest days, from the point of view of the old-time gold digger. After Gladstone's climb down in 1881, resulting in the retrocession of the country to the Boers, and the sowing of the seeds from which the whirlwind of 1899-1902 was reaped, the iniquitous "concession" system was inaugurated, under which vast tracts of land, practically the whole of the alluvial fields, passed into the hands of large land companies and speculators. At the period of writing, the old-time digger, working "on his own" in that capacity, is a *rara avis*. Several over-capitalised companies started work, at Spitzkop, Ross Hill, Graskop, Waterfall, Lisbon-Berlyn, Morgenzon, and Pilgrim's Rest; but one by one, after repeated re-construction, they were wound up. In the year 1906, the Transvaal Gold Mining and Estates, Ltd., working the Jubilee, Clewer, (old "Morgenzon"), Beta, Chi, and Theta mines, all in the vicinity of Pilgrim's Rest, Glynn's Lydenburg, and the lately formed Glynn's Extension syndicate at Sabi, were the only companies working. A strong syndicate is also working on McMe, and another at Nooitgedacht, between Lydenburg and Sabi. That portion of the district of Lydenburg lying on the western slopes of the Drakensberg consists of Upper Middle Veld, and small areas of High and Low Veld. Open rolling ridges, luxuriantly clothed with grass, and occasional rugged mountain tracts,

New Bridge over the Spekboom River, Lydenburg.

(The former bridge was destroyed by the Boers.)

BOER COMMANDO ON PARADE, LYDENBURG, 1901.

(Note the Horseman bearing the Colours.)

LYDENBURG.

1.—Typical Boers, Lydenburg district. 2.—Machadodorp Coach en route to Lydenburg.
3.—Building used as S.A.C. Charge Office and Public Works Department Office.
4.—Magistrate's Court and Post Office. 5.—A Street in Lydenburg. 6.—Spekboom River.

form the principal features of the landscape. The low-lying portions, the principal of which are Kruger's Post and the Ohrigstad Valley, the Badfontein Valley (between Machadodorp and Lydenburg), and the Spekboom and Steelpoort Valleys, are exceedingly unhealthy. Severe fever may be contracted there, and horse-sickness is rife in the summer. When the Drakensberg range is crossed, by either of the two passes, the one by Hell's Gate and the Devil's Knuckles between Lydenburg and Sabi, the other by Pilgrim's Hill, on the road from Lydenburg to the goldfields, the scene changes magically. The first plateau on the eastern slopes of the mountain (which actually form the eastern sea-face of the great inland plateau) presents a diversity of scenery the charms of which are excelled by nothing in the Transvaal, and by very little in South Africa. The pass by Hell's Gate is of the roughest description, barely negotiable except on horseback; but the immensity and rugged grandeur of the surroundings, combined with that indescribable charm of solitude which is never so keenly felt as amongst mountain scenery, well repay the visitor for the difficulties he has to surmount. Two important landmarks are passed *en route*, the Mauchberg, on the right (named after Mauch, the explorer), the highest mountain in the Transvaal, having an elevation of 8,725 ft., and Mount Anderson on the left, a detached sugar-loaf peak 8,100 ft. in height. The plateau upon which one descends from

The Anglican Church, Lydenburg.

the mountain, varies from three or four miles to eight or ten in width. It consists of rolling, well-watered grass country, and has an average elevation of about 4,000 to 4,500 ft. The eastern face of the mountain range is scarred with precipitous kloofs, all richly wooded; in these situations most of the natural High Forests of the Transvaal occur. There are many fine waterfalls in the district, the principal of which are the Bridal Veil, about 300 ft. high; the Sabi Falls, 80 ft., but with an immense body of water in the summer; the McMe Falls, 300 ft. high, and the Clewer Falls, near Pilgrim's Rest. Another striking feature is the existence of numerous stalactite caves, which have been but imperfectly explored, or are altogether unexplored. Many of them are of vast extent, penetrating into the mountain to unknown depths. They were used in former days by the natives, during their numerous inter-tribal wars, for hiding their cattle and women-folk, and to the present day, old relics, together with skulls, bones, etc., can be found within them. The largest of the known caves in the district are those at Pilgrim's Rest, McMe, and on the farm Ceylon, in the Sabi Valley. The plateau referred to above, is limited on the eastern side by a precipitous escarpment, far beneath which can be seen the bush-clad Low Country stretching away for 60 miles to the

Lebombo Range, and to the sea beyond. The view from the edge of the escarpment, particularly from the vicinity of the Blyde River Poort, baffles description; it is at once weird, wild, and beautiful to an extent that must be seen to be realised. The greater part of the Lydenburg district is essentially suitable for agriculture, and pastoral purposes. The cattle in the district have suffered severely from Rhodesian redwater, perhaps more so than in other districts, but the sound principle upon which the Government worked, with the object of checking the ravages of the disease, have borne good results. The principal crops raised in the district are wheat, mealies, kafircorn, oats, oathay, and potatoes. A very excellent quality of tobacco is cultivated. Fruit is largely and successfully grown, and eggs, poultry, and pigs are amongst the products of the districts. A small quantity of wool is also produced. The inhabitants are naturally desirous to hasten the commencement of railway construction, but the mines at Pilgrim's Rest still import their supplies of mealies from outside districts. The proposed construction of a railway has been on the *tapis* for a long time, and some ill-feeling has been engendered between the advocates of the rival routes—the one from Belfast to Lydenburg, and the other from Nelspruit to Pilgrim's Rest. Besides gold, coal and lead have been found in the division. At Magnet Heights, just outside the district, in the north-west, there is an enormous deposit of iron ore, some of which is magnetic. There are millions of tons of this ore in sight, and the deposit, if it could be worked at a profit, is large enough to furnish a supply sufficient to meet the demands of South African manufacturers and of other markets of the world. It is said that anywhere within a radius of ten miles from this iron mountain, compasses are affected by its magnetic influence. The principal rivers in the district are, to the west of the Drakensberg, the Oliphants River (which forms the northern district boundary), with its tributary the Steelpoort, having for its confluents the Spekboom and Blyde Rivers, into which, respectively, flow the Waterfall and Ohrigstad Rivers. To the east of the Drakensberg are the 'Mtiklowi, the 'Mxlasiri, and the Timbabati Rivers, rising under the extreme eastern escarpment, and flowing north-easterly into the Oliphants River; the Nguanetsi and Manzimtonti Rivers, which break through the Lebombo on the eastern border; the Mehlamhali or Sand River, which rises under the eastern escarpment, and flows south-east through the Government Game Reserve into the Sabi; the Sabi, rising under the Mauchberg, and falling over the eastern escarpment, after receiving the waters of the Little Sabi, thence flowing eastward to the Lebombo Range, and forming the south-eastern boundary of the district; and the Crocodile River, rising in the Steenkampsberg, and flowing eastward through the Badfontein Valley to join the Komati River.

The roads throughout Lydenburg district may be described as fairly good, several of them being excellent. The district is a large one, and the available staff employed on road construction is necessarily small, the funds at the disposal of the Public Works Department, for this purpose, being inadequate. There are some excellent bridges over the principal rivers. The capital town, Lydenburg, is a pretty little old-fashioned place, laid out in blocks, and, as is the case with so many Transvaal villages, having open water-sluits along each side of the streets, which are bordered with willow and other trees. Being close under the western slopes of the Drakensberg, the town is fairly well sheltered from the south-easterly winds. The Government buildings, in Market-street, consist of a handsome block containing the Court House and offices, and post and telegraph offices. The charge office of the South African Constabulary, and office of the Public Works Department are in a house at the back of this block. There is a comfortable cottage

Middle Falls, Little Sabi River, Lydenburg district.

hospital, near the upper end of the town, and, situated about a mile out on the Lydenburg-Sabi road, are the district headquarters of the South African Constabulary. At the upper end of the town stands the Agricultural Hall, a handsome building, ordinarily used as a Government school, but frequently requisitioned for dances, concerts, etc. The Lydenburg Agricultural Society holds its annual shows here, and on the adjoining ground. The Loretto Convent School and Roman Catholic Chapel are prettily situated in the upper part of the town. A sound course of education to pupils of any denomination is given at the former place by a competent staff. The Lydenburg Club, in Market-street, faces Church Square, and is a credit to the town. There is also a Junior Club. The Dutch and Dopper Churches are on Church Square. The pretty English Church of S. John's, and the rectory, stand in the centre of the town in extensive grounds, surrounded with oaks and willows. Portion of the ground is laid out for a tennis court. The Church has a very handsome carved oak chancel-screen, presented during the war by the military authorities. In the same street stands the pretty villa residence of the Resident Magistrate. There are several shops and stores in the town, branches of the Standard Bank and National Bank, and two hotels. The Standard Hotel is the starting point for the Machadodorp-Lydenburg - Pilgrim's Rest coaches, the proprietor being the local agent for Messrs. Zeederberg. The Plough Hotel is in Market-street. There are a few pretty private residences in the town. The press is represented by the *Lydenburg News*, a small weekly publication, run on strong anti-Government lines. Just outside Lydenburg to the east is the site of Fort Mary, of historical interest, as having been successfully held against the Boers in 1881 by a handful of men of the 94th Regiment, and a few volunteers from the goldfields. The men of the above regiment were the few that were left behind at Christmas time, 1880, when the headquarters marched to Pretoria and were treacherously waylaid and shot down from behind cover by the Boers at Bronkhorst Spruit. There was a large garrison in Lydenburg during the latter part of the war of 1899-1902; but very little fighting took place in the district, the local commandos not having much stomach for such work. The population of the town of Lydenburg in April, 1904, was 778 whites and 745 coloured persons.

Sabi Falls, Lydenburg district, and view up the Sabi Valley; "Devil's Knuckles" in the background.

Mr. THEODORUS RABIE.

At the first municipal elections in the town of Lydenburg, the name of Mr. Theodorus Rabie headed the poll. Mr. Rabie is of Dutch nationality, was born in the Cape Colony, and was admitted to the legal profession in 1892. He served his articles with Messrs. Franz Te Water and Paul Nel. He first practised in Pietersburg, where he resided for three years, after which he removed to Pilgrim's Rest, where he

acted as the representative of Messrs. Rooth & Wessels. It was not until 1902 that he actually opened his offices in Lydenburg, where he is now established as attorney, conveyancer, notary, and sworn translator, and where he has a large and increasing practice. His work of necessity brings him into intimate touch with local interests. As the result of his triumphant campaign at the polls, Mr. Rabie was elected Chairman of the first Municipal Council of Lydenburg, and filled the position with dignity, to the satisfaction and welfare of his fellow-citizens, and to the careful advancement of the interests of the town.

SABI GORGE, BELOW THE FALLS, LYDENBURG DISTRICT.

Mr. C. J. TRUTER.

Mr. Casperis Johannes Truter, J.P., attorney, notary public, conveyancer, and sworn translator, is the son of Mr. Hendrik Jacobus Truter, and a descendant of the early Dutch settlers who took up their abode in the remote region of Saldanha Bay, Cape Colony. Mr. Truter was educated at Malmesbury and Capetown. He displayed much ability in prosecuting his studies, and, having decided to adopt the legal profession, he served his articles with Messrs. Fairbridge & Arderne, Capetown. In 1892 he was admitted as a practitioner of the Supreme Court. Mr. Truter first started in practice at Venterstad (Cape Colony); subsequently, in 1894, he proceeded to the Transvaal, where he became associated with the firm of Messrs. Haarhoff & Hull. On the death of Mr. Haarhoff in 1895, Mr. Truter joined Mr. H. L. Scholtz, and in 1898 he became a member of the firm of Fotheringham & Truter, Lydenburg. In 1903 this firm, while still retaining its original style, passed into the sole control of Mr. Truter. He is legal adviser to the Lydenburg municipality, and to the local branch of the Standard Bank of South Africa. Mr. Truter, who is a man of conspicuous personality and force of character, takes a wide interest in all local matters, particularly such as appertain to pastoral and agricultural pursuits. Towards the close of 1905 he was busy establishing a stud farm, for the improvement of the local breed of horses.

Machadodorp.

The traveller who enters the Transvaal from the eastern side, after journeying for a considerable time through the low country, with its hot and unhealthy climate, experiences a very agreeable surprise when, after climbing the steep gradient from Waterval Onder, he finds the air gradually cooling, and on reaching the High Veld, although he may perhaps for a moment regret the fine scenery he has left behind, as a rule he is only too glad to breathe the splendid health-giving air of the higher altitude. The first township he arrives at is Machadodorp, which is distant by rail 193 miles from Lourenço Marques, 201 miles from Johannesburg, and

48 miles by road from Lydenburg. Although at present only a comparatively small place, it gives every promise of a future. It at present occupies a satisfactory position among the minor municipalities of the Transvaal. Machadodorp is situated about 5,280 feet above sea level, and its fine climate has long since caused it to be recognised as a health resort. This recognition, however, is not due to the fine climate alone, but equally to the existence of a warm sulphur spring in the immediate vicinity of the village, a spring the waters of which have been proved an ideal cure for rheumatism and all diseases arising from impure blood. Many persons who have lost their health and strength in the low country come here to regain both. From a business point of view Machadodorp enjoys many advantages. It is the point where several transport-roads converge. Those leading to Ermelo, Carolina, Lydenburg, and Swaziland start from here; coaches run regularly between Machadodorp and Lydenburg and Pilgrim's Rest, and besides the main eastern railway line it is expected that within a few months the trains will run to Ermelo, while fond hopes are entertained that in the near future Machadodorp will also be the junction for the Lydenburg branch line.

The surrounding district is fairly well populated, and the soil is fertile, so that good crops are won annually, while cattle farming, though at present not so flourishing as before the war, is becoming more and more pronounced as the effects of the war disappear. The mineral wealth of the place has not yet been adequately gauged, though satisfactory indications are not wanting. Gold has been discovered in several places, galena, tin, and cinnabar have been found, while it is believed that the soil in parts is diamondiferous. Coal has been found in the immediate neighbourhood, and one of the mines is already being exploited, while a strong syndicate is at present opening up one of the finest marble quarries at a short distance from the township.

In the time of President Thomas Burgers, in 1878, the proposed railway line from Delagoa Bay to Pretoria was surveyed, up to the place where at present the township is situated, by Colonel Machado (afterwards Governor of Lourenço Marques), but the scheme was not then carried through. When about 15 years later the line was constructed by the Netherlands Company, Machadodorp became a very busy place. Huge quantities of stores were deposited here, large camps of employés dotted the site of the present township, and as it soon became apparent that the station here would be an important goods station, a local syndicate of four or five enterprising people bought a portion of the farm "Geluk," which was crossed by the railway, had it surveyed in a number of freehold plots, which found ready buyers, and thus formed the beginning of the present township. It was on the suggestion of President Paul Kruger that the new village was called after Colonel Machado.

In 1893 the only permanent buildings were the "Hotel de France," which still exists, and a couple of stores, but gradually the place grew, especially when the Ermelo-Machadodorp railway was surveyed. The earthworks were made, and everyone expected that the trains would soon run, and shortly before the war endeavours were made to have the village proclaimed as a Government township. The outbreak of the war prevented this, but the same war brought notoriety to Machadodorp in another manner, for after the occupation of Pretoria, the Government of the late South African Republic went *en masse* to Machadodorp, and a special *Gazette* proclaimed Machadodorp the "seat of government." Those were busy days for the township. Immense quantities of provisions were stacked everywhere, and officers, burghers, and officials, coming to and fro, crowded the place, especially where Z.A.S.M. carriages housed the different Government departments. President Kruger himself lived here for some time, but afterwards went to Waterval Onder, where the climate was more congenial to him. The Z.A.R. Government was forced to leave the place on August 27th, 1900, when Machadodorp was for a time shelled by General Buller, who upon the following day made his entry at the head of his army. The place was left in charge of Brigadier-General Reeves, and all through the war Machadodorp was a very important centre, as the head supply depôt for the Eastern Transvaal, and enormous transports were continually sent out from here to Lydenburg and other places. On an average about 6,000 troops were always stationed at Machadodorp. The hills in the neighbourhood are still scarred with trenches and earthworks as souvenirs of those troublous days. The battle of Helvetia could be watched from Machadodorp, and a few days later, on January 10th, 1901, the village had to sustain a determined attack by the Boers, who only withdrew after severe fighting. Several lesser attacks were made at different times. It may be mentioned that Machadodorp from a strategical point of view was considered by the military far superior to Middelburg.

After the war a big Repatriation Depôt was established at Machadodorp under Capt. Bourne, which kept many busy, and the place grew very quickly. Several new stores were opened, a splendidly-appointed hotel—the Eastern Hotel—built, a steam mill, and a brewery erected, and the number of private houses increased very rapidly, so that in a short time the place began to look quite prosperous.

In February, 1904, an Urban District Board was established at Machadodorp, and again efforts were made to have the place proclaimed as a Government township. The Urban District Board subsequently was changed into a Municipal Council, and finally all difficulties which hindered the proclamation were removed, town lands obtained, and at last, on the 30th of December, 1904, by Proclamation No. 100 of 1904, Machadodorp was proclaimed a township. During the first year the Town Council did a good deal of work, under exceptionally difficult circumstances. Notwithstanding the fact that no erf-tax could be collected and that no assessment rate was levied, an efficient sanitary service was inaugurated, drinking water laid on to the houses of the inhabitants, streets repaired, and, last but not least, the principal streets planted with trees, which promise to soon be a very great ornament to the town. A new building for Post Office and National Bank is in course of construction, and new quarters for the S.A. Constabulary are being built, as well as stores for the Public Works Department, while efforts are being made by the Municipality to obtain a Courthouse, and for a Prison to be built here. A Periodical Court is held at Machadodorp every Friday. The warm sulphur bath is now being exploited, and a bath-house has been built over the spring, while grounds have been laid out and planted. It is confidently expected that as soon as the splendid health-giving properties of this spring are more widely known, many will come to test its powers. There is much yet to be done at Machadodorp, but considering the short period of its life, and the many difficulties it has had to overcome, the township has every reason to be proud

of the progress made, and has by its steady growth and increasing prosperity shown that it stands on a firm foundation. There can be hardly any doubt that in the future, as in the past, Machadodorp will give a good account of itself.

Mr. JAMES BUTTON.

One of the most enterprising firms in the Eastern railway district is undoubtedly that of Mr. James Button, farmer, stock-raiser, produce-merchant, brick manufacturer, butcher, baker, blacksmith, and wheelwright. From this list of industries, which cannot fail to impress all who study it with a sense of Mr. Button's talent and versatility, it will be seen that practically all the chief needs of the district are catered for, and it is not astonishing that such enterprise has been rewarded with wide success. Mr. Button is a native of Lincolnshire, England, and landed in South Africa in 1875. After spending some time on the Kimberley diamond fields, he proceeded to the Zoutpansberg district, where he gained some experience as a prospector at Pilgrim's Rest and other of the northern goldfields. He finally started in business at Barberton and along the railway line then in course of construction. In 1892 he settled at Machadodorp, where he opened butchery, bakery, and produce stores, extending branches of his various undertakings to Waterval Boven and Waterval Onder. At the first-named place the business is known as Button & Wentzel, and at the latter it is in the name of Andrew Gay & Co.; in both cases the management is in the hands of the local partners. In 1902 Mr. Button purchased a small wheelwright and blacksmith's concern in Machadodorp, which he moved to a central position in the town, and which is now of important dimensions. In addition to these large and growing interests, Mr. Button has two farms at Godwan station, about thirty-two miles from Machadodorp. Here he is carrying out extensive agricultural undertakings, stock-raising, and brickfields. His bricks are of excellent quality, and all the local Government requirements have been supplied from his kilns. The stock raised on these farms includes cattle, merino sheep, and some horses; the crops consist of mealies, kaffircorn, forage, potatoes, and tomatoes; besides which tobacco is extensively grown. There are upwards of five hundred acres under cultivation, with very satisfactory financial prospects. Mr. Button had a seat on the first Municipal Council, and naturally takes a keen interest in the affairs and the future of the town which he has done so much to develop.

Messrs. DE GRAEFF & SCHENK.

The firm of De Graeff & Schenk, forwarding and commission agents at Machadodorp, is one of considerable importance, as after having done pioneering work of immense value in the districts which the firm has helped to open up, it is now the recognised forwarding agency for many of the big business houses on the Rand in their dealings with the northern towns and goldfields. They are also agents for the "Corner House," Messrs. Eckstein & Co. being the owners of Lydenburg Estates, and therefore holding considerable interests in the north. The volume of merchandise passing through the hands of Messrs. De Graeff & Schenk is necessarily very large, as they are not only forwarding goods to Lydenburg, Pilgrim's Rest, Carolina, and Swaziland, but in addition they are the only produce buyers in the district of Machadodorp, and supply foodstuffs to the settlements all down the Eastern line—this being, in fact, the larger part of their business. The Company's offices and storing premises are leased from the Railway, and adjoin the station. Mr. H. De Graeff is the second son of Mynheer G. A. De Graeff von Polsroek, of Amsterdam, a scion of the old Dutch nobility, who still resides in the Cape Colony; and the son who is now the head of this enterprising firm was born and edneated at Mossel Bay, Cape Colony. He trekked to the Transvaal in 1882, at the time of the first rush to the De Kaap goldfields, and while at De Kaap he pursued many avocations, from prospecting to storekeeping, the adventurous and happy-go-lucky life of those days lending itself to many easy changes and vicissitudes. In 1885 he ventured his luck in Natal, but returned to the Transvaal in 1887, and was storekeeper in Nelspruit for some 18 months; then, following up the railway line, he settled in Machadodorp in 1895, being at that time the third resident of the infant dorp. Here he opened his present business, and subsequently joined the firm of Mr. H. Schenk, now his partner. Mr. De Graeff was one of the original members of the first Municipal Council of Machadodorp, and at the commencement of 1906 was Vice-Chairman, so is in intimate touch with all local affairs, in which he is naturally much interested. Mr. Schenk is a Natalian, and is in charge of the forwarding branch of the business.

THE EASTERN HOTEL.

An account of enterprise in the little eastern township is not complete without giving some idea of the attractions for visitors as well as for business men in the way of accommodation provided for them. There is an abundance of game in the neighbourhood, which is therefore much frequented by sportsmen. In the immediate vicinity of Machadodorp the sulphur springs, at which a bath-house has been erected for the convenience of the public, attract travellers and invalids. The Eastern Hotel is the only establishment for the entertainment of these guests, and will bear comparison with any in the provinces. The house was built in 1903, a double-storied structure of stone, facing the Market Square and occupying four stands. There are the usual reception rooms, dining-room, drawing-room, and smoking-room, a billiard-room fitted with a new Thurston's table, a large concert hall for local entertainments, and seventeen bedrooms all furnished newly and thoroughly. The *cuisine*, under the personal supervision of the proprietor, Mr. M. Starfield and his wife, is good, and the house has

The Eastern Hotel, Machadodorp.

already earned an excellent reputation. A 'bus and porter attend at the station to meet all trains, conveying travellers and their luggage to the hotel. This vehicle is at the free disposal of such visitors as wish to take advantage of the sulphur baths, tickets of admission to the bath-house being obtainable at the hotel. The proprietor of the Eastern Hotel has lived in South Africa since 1891, most of which period has been spent in Johannesburg.

Middelburg.

That Middelburg will some day, possibly in the near future, become one of the richest districts in the Transvaal, is an assumption which, when carefully analysed, may be condensed into the commonplace saying, "the wish is the father to the thought." No sane man is likely to invest capital or devote his time prospecting in a district without first carefully weighing in the balance

the probabilities as well as the possibilities of satisfactory results. It would thus appear to be most advisable to inspect pretty closely the resources of the district, and then to leave those interested therein to draw their own conclusions therefrom.

Perhaps, before giving reference to the district, it would not be out of place to give a passing glance at the town of Middelburg, which has been so frequently designated "the capital of the Eastern Transvaal." This appellation cannot be said to be entirely undeserved, for the town lies almost in the centre of the Eastern Districts, and is on the main line of the Delagoa Bay Railway, within easy access of the Capital and also of the sea coast. Situated as it is some five thousand seven hundred feet above sea level, the air is pure and healthy, and makes it a resort for consumptives and others who require pure dry air for their lungs.

It is not necessary to give details of the health statistics of the town; suffice it to say that the death-rate is infinitesimally small, and that the undertakers complain that they cannot make a profit out of their business. The facilities afforded for a water supply are all that can be desired. A valley to the south-west of the town is well furnished with many fountains of water of excellent quality. The lower lying fountains produce the water supply of the Military Cantonments, the water being conveyed in pipes from the fountain-heads to a receiving reservoir, whence it is pumped by machinery into service tanks for distribution. The town supply is at present derived from a spring at the head of the valley, and is conveyed in pipes for a distance of about two or three miles to the town, where numbers of standpipes are erected at the most convenient spots for those inhabitants who are not able to have house connections with the mains. This supply is the result of a temporary scheme lately carried out by the Municipality which copes with the most pressing requirements of the town, but in the near future it will be considerably augmented by the inclusion of a bunch of fountains which rise in an offshoot of the same valley, and which will yield a supply sufficient for all needs of the town for many years to come. Apart from the above-mentioned fountains, a fair stream of water drains from this valley, and after being collected into a furrow is utilised for the irrigation of the western portion of the town. The remaining part of the township is irrigated by means of furrows which lead water from the dam or resorvoir which was built by the late Government at the foot of the valley situated to the south-east of the town. This dam, in addition to collecting the rainfall of a considerable catchment area, is fed by some springs which augment the supply during the dry season.

VIEW OF MIDDELBURG.

The northern limits of the town are skirted by the Klein Olifants River, which up to the present has not been utilised to any great extent for other than bathing and washing purposes, but no doubt as time advances and the town progresses this resourceful asset will have more attention paid to it. To the south-east of the town are situated the Military Cantonments, where some 3,000 troops are quartered in well-built huts. Thousands of trees have been planted by the authorities, and a beautiful avenue, running through the entire length of the cantonments, has been laid out with care and forethought. All the huts and buildings as well as the streets are lighted with electric light, which is generated by the Royal Engineers. Rumour has it that in the near future the garrisons of the two new colonies will gradually be centralised, but there is little doubt that the Middelburg garrison will only be withdrawn at a considerable time after the other country towns have been denuded of the troops stationed there. It is not wise to anticipate, but one cannot help thinking what a splendid asset these Cantonments will be to the Municipality should the authorities decide to withdraw the troops at some future date. A beautiful suburb already made!

In buildings the town of Middelburg cannot be said to be superfluously rich, but the building of modern-styled villas, business houses, and such like, proceeds with a refreshing regularity. At present the principal Government buildings are the Court House and Post Office combined, which block will shortly be augmented by a charge office attached, and a new prison now in course of construction which, when completed, will be capable of holding about 100 prisoners, and will be the chief convict station of the Eastern Districts. Other buildings may be shortly summarised: three banks, six well-built churches, four hotels, stores innumerable, a club, and orphanage, and many pretty villas and dwelling houses. It would be out of place, however, to neglect to mention the Dutch Reformed Church which stands out nobly in the centre of the town as a lasting testimony to the religious characteristics of our new fellow-citizens, and also the English Church, which has been lately enlarged, and now ranks second to none among the country churches of the Colony.

Of schools there are four—the Government Free School, attended by about 180 scholars, which has recently been built in spacious grounds upon the most up-to-date plans; the Provincial School, attended by some 120 scholars, which is but a temporary structure of wood-lined iron, with ample playing grounds; the Town School, South, attended chiefly by the children of the poorer classes who inhabit the southern portion of the town; and the Dutch School, which is connected with the Dutch Reformed Church. Though hardly to be classified as a building, the bridge over the Klein Olifants River must not be forgotten. It consists of two well-masoned arches with stone and iron superstructure, and was erected by the Republican Government.

Sport may fairly be said to be well patronised in Middelburg, seeing that there exists a well-established Racing Club, which holds quarterly meetings, two good civilian cricket clubs, three football clubs, a hockey club, and a golf club. Needless to say, the military assist very largely in maintaining all the different branches of sport.

Turning to the district, and looking first at the agricultural prospects, one cannot help being struck with the diversity of conditions for which the district is renowned. To the south of the Pretoria-Delagoa Bay railway line lies what is known as the High Veld, which consists of undulating grassy slopes broken but occasionally by somewhat sluggish streams and rivulets, fringed here and there with rocky low-lying ridges, and by innumerable "pans" which are much sought after by farmers for grazing ground. To the north of the railway line the ground becomes more broken as we approach the Low, or Bush Veld, and we find ourselves confronted with ranges of hills such as the Botha's Berg and Steenkamp's Berg and a grandeur-producing valley named the Steelpoort. On the High Veld cattle of every description flourish, and sheep are very successfully raised. Horse-sickness is almost unknown, and the numerous diseases of horned cattle are less virulent than in the Low Veld. Cereals are easily grown, but the chief product is mealies, as the want of irrigation water debars the farmer from sowing more wheat and oats than is required for his personal use. The sharp frosts and biting cold winter winds prevent the culture of fruit trees to any extent, and the same climatic conditions are a deterrent to market gardening on anything approaching a large scale. In the Low Veld, where the climate is temperate, cattle thrive better and develop quicker, but are more subject to the many diseases which are peculiar to the country. Horse-sickness in particular is extremely virulent in some parts. Sheep are not found here at all, the pasturage being too rank and rapid in growth to suit them. Happy is the farmer who has two farms, one on the High and the other on the Low Veld, for he spends the summer months on the cool, breezy uplands away from fever and cattle diseases, and then treks away to the warmer lowlands as soon as the veld puts on her autumn garb, and the frost

Chairman and Councillors, Middelburg Town Council, 1905.

compels him to wear his jacket or to remain indoors during the hours when a farmer should be at his work. With a good water supply the lowland agriculturist raises his winter crops of wheat and oats which are reaped in time for the sowing of mealies, pumpkins, water-melons, and other market commodities which mature at a rapid rate. Here, too, may be found luxurious orchards consisting mainly of peach and apricot trees, as from these fruits the farmer makes a very good brandy, and also utilises them as an article of household food in a dried state. Orange trees flourish, and the fruit obtained therefrom is sold at a profitable figure.

Special mention should be made of the allotments known as the "Mapoch's Grond Perceelen." These are scattered around the stronghold of the native chief named Mapoch, who was subdued and deprived of his land by the Boers in the year 1883. Some 300 odd allotments, in extent about 25 acres each, were carefully laid out by a surveyor and were distributed among the poorer class of Boers who had no land of their own. All of these allotments are well watered, and most of them are snugly nestled in the fertile valleys where agriculture of every description can be successfully carried on. Many of these allotments are valued at £400 each, and are as productive as a large farm. The poorer agriculturist naturally is very much attached to a farm whose entire extent can be viewed from his dwelling house, and which can be inspected from end to end in a comparatively short space of time. The northern portion of the district may be said to be inhabited mainly by natives. A considerable amount of trade is carried on with these natives in cattle, grain, and other merchandise, and the native-labour recruiting agent here finds a big field for his labours.

Municipal Offices, Middelburg.

One thing which cannot fail to strike the new-comer who traverses the land with his eyes open is that the Government has done so little for the district. To be more concise, we find no experimental farms such as is found at Potchefstroom and other more favoured districts. Perhaps that may be explained away by saying that the Government possesses scarcely any land in the district. Of settlers a few are to be found on a portion of the town lands obtained from the Municipality, and they are certainly making steady but unostentatious progress, evidently preferring to devote their time to the development of their land rather than to booming their results in newspapers. A few are to be found scattered about in the district, and they likewise seem to be bent on working quietly and silently.

The Government is, however, working one farm, "Gemsbokfontein," which is almost contiguous to Pan station. Here the Forestry Department have planted themselves, and it is fervently to be hoped that they will take root and eventually bring forth fruit a hundred-fold. A truly magnificent fountain gushes out of the earth at a spot about two miles from the railway station, and here is to be found a nursery garden, the remainder of the farm being planted with timber-produeing trees. The soil is all that can be desired, and is free from stones and other obstructions so detrimental to the agriculturist, added to which the whole extent of the farm slopes beautifully down to the railway line. Thus in time to come the transporting of timber to the railway from any point of the farm can be carried out with a minimum of labour.

Such, then, is the present aspect of the district of Middelburg. Nothing

very startling, but nevertheless there is something distinctly solid about it; and a solid foundation is of far more importance than superficial expectations of wealth.

The agriculturist never wearies of impressing upon his fellow-creatures that farming or agriculture is the backbone of a country; on the other hand the miner, the speculator, or the capitalist is equally persistent in his endeavours to assure you that the wealth of a country lies solely in its mineral resources.

Mr. O. C. WEEBER.

Mr. O. C. Weeber, who was elected Mayor of Middelburg for the municipal year 1904-5, ranks as one of the best-known among the sturdy colonists who have made their mark in the history of South Africa. He was born in Beaufort West, Cape Colony, in 1843. At 17 years of age he joined the firm of Mosenthal & Lilienfeld, Hopetown. A mercantile life was not to his fancy, however, and soon afterwards he organised a hunting and trading expedition to the far interior. The expedition was absent from civilisation for three years, visiting then almost unknown territories — Bechuanaland, Khama's country, Matabeleland and Mashonaland, the Zambesi, Lake N'Gami, and further. The expedition lost six of their party before they returned to Hopetown in 1867. Mr. Garcia, son of the Resident Magistrate of Riversdale, and five natives, had succumbed to the lake fever. Mr. Weeber left for Pretoria, where he was appointed Landdrost's clerk, public prosecutor, and postmaster. After retaining the position for some years, he was appointed Landdrost of Wakkerstroom, and later transferred to Middelburg as Landdrost. He has resided in that town for upwards of thirty years. On the British annexation of the Transvaal in 1877 Mr. Weeber proceeded to Pretoria and resigned his position as Landdrost. He then started a law and auctioneering business, which has been continued by him ever since. Although avowedly a staunch Republican, Mr. Weeber is known as a man of wide and progressive views. His appointment as Mayor of the town, with which he has been intimately connected for so long, was a popular one. In the seventies, during the Sekukuni war, he took his share in the defence of his country. One of the forts, afterwards built for occupation of Volunteers, was named after him.

EASTERN TRANSVAAL BREWERIES, LIMITED.

The Eastern Transvaal Brewery Company, Limited, of whose premises we publish an illustration, was established in 1904 by local enterprise, and the district has since been amply supplied with lager beer, ale, and stout from this institution. The buildings were completed in April of the year mentioned, and a plant was installed which had been specially imported from England and Germany, and which is of a most complete and modern description.

The Railway Station at Middelburg.

Post and Telegraph Office and Court House, Middelburg.

Offices and Auction Mart of Mr. O. C. Weeber, Middelburg.

Thanks to expert management, and the existence in the neighbourhood of an extremely fine supply of water, the quality of the firm's products is of a high standard, and the capacity of 2,000 gallons per diem is taxed to equal the requirements of the Eastern Transvaal and the Portuguese territory. The demand for the light and dark lager beers which are produced by the Company is steadily increasing, and additions to the plant and premises are in contemplation at the time of writing. The managing director, Captain Grothaus, has been personally identified with the undertaking since its inception.

Mr. J. W. HENWOOD.

Mr. J. W. Henwood opened his store in 1882, and at that period there were only two firms in Middelburg with whom he had to compete. The trade he does is a very general one, and includes dealings in such wares as ironmongery, drapery, groceries, saddlery, crockery, boots and shoes, agricultural implements, and all classes of machinery. Indeed, so universal a provider is Mr. Henwood recognised in the district that he draws custom from a radius of about fifty miles. The head of this concern has naturally been closely identified with the growth of the commercial life of the locality, and, accepted as a man of proved stability, he has taken a prominent part in consolidating the interests of those en-

THE EASTERN TRANSVAAL BREWERY, MIDDELBURG. Another View. The Staff.

gaged in industry. He is the President of the Middelburg Chamber of Commerce—in fact, has held that office since the inception of the institution—and he is also honorary secretary of the Secondary School Committee. In addition, Mr. Henwood is Chairman of the local branch of the Progressive Association, is a member of the Agricultural Society; and besides being an able adviser on other public bodies, is a committeeman of the Turf Club of the town.

THE IMPERIAL HOTEL.

Though it has only had an existence of a little over three years, the Imperial Hotel, Middelburg, is one of the most commodious and best appointed institutions of the kind in the Eastern Transvaal. The proprietor is Mr. Chas. Mathias, who is a courteous and accomplished Boniface, and a skilled caterer to the public taste. There are no fewer than 40 apartments in his establishment, and the attractions include two billiard tables, an up-to-date sample room for the use of commercial travellers, private and public bars, and accommodation for banqueting and private dinner parties. Mr. D. R. Mario manages the hotel for the proprietor, and has a high reputation for the manner in which he watches the comfort of the guests and superintends the *cuisine* functions. It may be added that there is a modern-equipped ladies' and gent.'s hairdressing saloon in the building, which occupies a full block, and that an omnibus from the hotel meets all mail trains.

IMPERIAL MINERAL WATER AND ICE FACTORY.

A creditable reputation has been won in the Eastern Transvaal by the Imperial Mineral Water and Ice Factory. This establishment, it is interesting to note, was started in 1901, while the late war was still in progress, and the comprehensive plant was conveyed from the coast by the special permission of the General commanding. The premises are replete in all the modern equipment of such a business. A 10 h.p. Hornsby-Ackroyd oil engine supplies the motive power, and the aërated water and bottle-washing machinery is of the well-known make of Mr. Edward Taylor's firm, while there is a seven-candle filter by Birkenfield in use, and also a 2 h.p. Hercules ammonia compressor. There

Store of Mr. J. W. Henwood, Middelburg.

are in addition, housed in the establishment, the usual ice tanks, freezing chambers, and incidental paraphernalia; and every precaution is taken to ensure clean conditions in the work of output. We may remark, in conclusion, that the Company are contractors to His Majesty's troops and to all the members of the medical faculty. Messrs. G. J. Smith & Co., of Whitebank, are the proprietors of the concern.

Mr. J. W. Henwood's House, Middelburg.

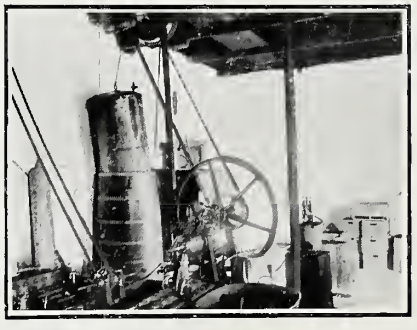
THE IMPERIAL HOTEL, MIDDELBURG.

1.—The Bar. 2.—The Billiard-room. 3—The Dining-room.

Messrs. H. LAVER & CO.

The firm of Messrs. H. Laver & Co. takes pride to itself for the fact that its establishment was the first groeery and provision merchant's store to be opened on the east of Pretoria. Messrs. Laver & Co. are eaterers to His Majesty's Forees, and they contend that their stock is the most eomprehensive and the finest in seleetion that ean be found under any roof outside Johannesburg. The business was established at Middelburg and Witpoort in 1886; and, in addition to being direct importers of the best brands of edibles—their London agents are Messrs. Beekett, Son, & Morton—they are millers, and dispense wheat, Boer-meal grown from colonial-grown stuffs, seeds, oats, farmers' requisites, and also a special blend of tea known as "True Leaf." Laver & Co. are also proprietors of a bakery, are house furnishers, and have the sole title to the sale of "the Pride of Middelburg" tobaeco.

The Imperial Mineral Water Factory, Middelburg.



Plant in the Imperial Mineral Water Factory, Middelburg.

Nylstroom.

Nylstroom, the capital of the Waterberg district, is situated on the main railway line to Pietersburg. It takes its name (Anglice, "Nile stream") from the river flowing through the district, which with geographical uncertainty was mistaken for the Nile by the early *voortrekkers*, who subsequently found to their disappointment that it was only a tributary of the Limpopo, the present boundary between the Transvaal and Rhodesia. The population of Nylstroom as shown in the census of 1904 consisted of 361 whites and 238 coloured people. The official part of the township includes a small pile of Government buildings, in which are situated the Resident Magistrate's Offices, the Court House, and the Post Office. In the business quarter are two hotels, the premises of the firm of Mr. E. Tamsen, J.P., particulars of which establishment are given elsewhere, and several minor stores conducted by small traders. Prior to 1903 the affairs of the township of Nylstroom were administered by an Erven Board, but in that year a Municipal Council was formed, of which Mr. E. Tamsen is now the chairman. A water scheme is at present under consideration, and efforts are being made to send the township ahead. In the district, it may be mentioned, copper has been discovered on several farms, and on one of these, Blaauwbank, which lies to the north-east of Nylstroom itself, developments are being actively carried forward, there being about 1,000 "boys" employed. There are many old mineral workings in the neighbourhood, and there are good indications of copper and tin deposits. Up to the present, however, prospectors have devoted their attention more to the discoveries of gold and diamond propositions; but, from information collected from fairly reliable sources, and specimens shown to us, it would apparently be more profitable for prospectors to follow up the indications of the baser metals. On the farm Buffelsfontein, some 15 miles to the west of Nylstroom, there are old copper workings contained in malachite ore. The aboriginals in past days evidently worked these properties for manganite, which they used for the purpose of oiling their assegais. It is claimed by prospectors in the district that deposits of this ore are present in payable quantities, and from specimens submitted to expert examination its quality appears to be marketable.

Respecting the actual agricultural resources of the district of Waterberg, the farms surrounding Nylstroom are at present producing fruit, more

H. Laver & Co.'s Premises, Middelburg.

especially of the citrous classes, and tobacco, while the main products consist of mealies and wheat. The latter is absorbed by local consumption.

Summarily, one-third of the land of the district is in the hands of companies, one-third is held by the Government, and the remainder is privately owned. The land in private ownership is the only section at present being worked. Were the other two-thirds put under development, the

Interior View of H. Laver & Co.'s Premises, Middelburg.

district would doubtless make forward strides. The local inhabitants are strongly in favour of a land tax being levied, which would doubtless have the effect of forcing this to an issue. While the district under review has been given a reputation for being malarial, statistical information shows this to be unwarranted.

NYLSTROOM, CAPITAL OF THE WATERBERG DISTRICT.

Nylstroom may be described as a good field for sportsmen, and in this connection it might be mentioned that as many as 300 springbuck have been railed from the township to Pretoria within a month. Within recent years herds of cattle have been introduced into the Waterberg district, and this enterprise on the part of the farmers has shown fair results, despite drought and other difficulties, met with more or less generally throughout South Africa. In the pastoral portion of the Crocodile River valley, the scourge of rinderpest which spread over the sub-continent some years ago was experienced in virulence among the herds. The passing of the war also did much to decimate stock.

Members of Nylstroom Urban Board, 1905.

The scenery about Nylstroom is uninteresting, the country being flat, relieved in a measure by a range of hills near the township. Fruit-raising and pastoral pursuits, with the introduction of a good system of irrigation, should in the future develop the resources of the Waterberg, if capably applied by the Boer farmers and the Europeans who have settled in the district since the conclusion of the war.

Mr. E. TAMSEN.

The principal store in Nylstroom is owned by Mr. E. Tamsen, who is a J.P. of the district. Mr. Tamsen arrived in the township in 1882, when the place only contained two

buildings, the Government offices and one private residence. Our illustration will show the growth of Nylstroom since that period. Mr. Tamsen established himself in premises overlooking the Market Square, and as his enterprise prospered made numerous additions. The business consists of the store of a general merchant, added to which there is a

Dopper Church, Nylstroom.

bottle store—the only one in the township. Mr. Tamsen also holds the only licence in the district for supplying firearms. The stock carried is large and extremely comprehensive. The name of the firm is a "household word" with the farmers for miles around, whose confidence and respect Mr. Tamsen has gained and retains. Lumber and building material yards are attached to the premises, and the handling of the materials stored there forms an important part of the firm's trade. Prior to Mr. Tamsen's arrival in Nylstroom he had been engaged in general merchandise trade in Pretoria for a number of years, having been employed in the capacity of clerk in one of the large houses in the capital. He was originally attracted to the Waterberg district by the reports of its mineral deposits and agricultural value. At one time the subject of this sketch opened up as many as 10 branch stores in the district, but desiring to concentrate his interests he finally abandoned all but one of these, and he now confines his trade principally to his central store. Agricultural implements form a prominent part of the stocks. In addition, Tamsen's supply clothing, furnishing goods, groceries and drapery in large variety. In a word, this old-established house is a general emporium where all the necessaries of life may be obtained.

Government Buildings, Nylstroom.

Main-street, Nylstroom.

OTTOSHOOP AND THE MALMANI GOLD FIELDS.

Ottoshoop, a small town situated in the Western Transvaal on the Malmani River, is 18 miles south-west of Zeerust and 22 miles east of Mafeking. It enjoys what is probably the most salubrious climate in the Transvaal, disease being almost unknown, and with the advent of the railway, now in course of construction, the town should become, with its advantages of water and scenery, the sanatorium for Kimberley and Johannesburg. The olive-clad slopes of the river and the roman-

Masonic Hall, Nylstroom.

STORE OF MR. E. TAMSEN, NYLSTROOM.

tic caves which abound in the neighbourhood, should prove an irresistible attraction to the visitor. Fruit and vegetables are abundant, and cereal growths are cultivated to a large extent in the district. The Government has decided to sell vacant stands, the property of the State, and it is anticipated that this will lead to considerable progress, which the town needs, as since the late Anglo-Boer war it has not advanced commercially. Ottoshoop is the centre of the Malmani Gold Fields, which form a large area comprising the magisterial districts of Marico and Rustenberg. These fields, which were discovered about 1887, have had a somewhat unfortunate history, but as practically no thorough and systematic working has so far been attempted, there is every probability of them still offering some excellent mining propositions in the Transvaal. Thus far no shaft has been sunk to a greater depth than 127 ft., where the reef was found. Water is abundant for all purposes. In addition to gold and silver, base metals, including copper, lead, silver and zinc are found in the neighbourhood. When railway communication is completed Ottoshoop and its district should prove the centre of a lucrative mining industry. Stock of all kinds do well in the district. The home of the wild ostrich is near at hand, and game is abundant.

MR. BEN A. KUUN'S STORE, OTTOSHOOP.

Ottoshoop.

Mr. BEN A. KUUN.

Mr. Ben A. Kuun, who is a native of Swellendam, Cape Colony, arrived in the district in 1885, and entered into commerce at Zeerust. In 1887 he proceeded to Ottoshoop to manage the store which he at present owns. He remained in this position until 1896, when he took the concern over on his own account. The business, which is that of a general store, is the principal commercial enterprise in the village. The stock carried is both large and varied, and the trade generally has been considerably extended of late years. In addition, Mr. Kuun goes in largely for stock-raising and general farming, and in this latter connection owns one of the best agricultural farms in the Marico district, which contains a water supply about equal to that of the Malmani River. Several gold reefs run through the property, including the famous Crystal Reef, extending some six miles. Mr. Kuun is assistant secretary to " Het Volk " for the Marico district, and a number of the inhabitants of the surrounding country obtain both advice and assistance (the latter in a most practical form) when they require it, from this gentleman, who has the welfare of his district very much at heart.

PANORAMIC VIEW OF PIETERSBURG.

Pietersburg.

The capital town of the district of Zoutpansberg is Pietersburg, which is distant by rail 178 miles N.N.E. of Pretoria, and is the last station on the northern railway line. It is the point of departure for the mining districts lying to the east and west, and many adventurous, and often ill-fated, expeditions have started thence for little known and fever-haunted tracts where "treasure" was supposed to be. The

"Hard Cash," a famous Racehorse,
owned by Mr. Duncan, of the Caledonian Hotel, Pietersburg. The lady with horse is Mr. Duncan's eldest daughter.

town is a rallying-point for many old diggers and miners from the Low Country, and for numbers of those who are on sport and pleasure bent. In the early days of the Boer republics the *voortrekkers* made heroic efforts to establish centres in the district, and the Boers who established themselves in and around Schoemansdal conducted themselves as an independent community. Fever and native troubles, however, exhausted their spirits and resources, and many promising farms and gold properties were abandoned, the district becoming practically deserted by Europeans. Later on, the tide of population again flowed,

The Caledonian Hotel, Pietersburg.

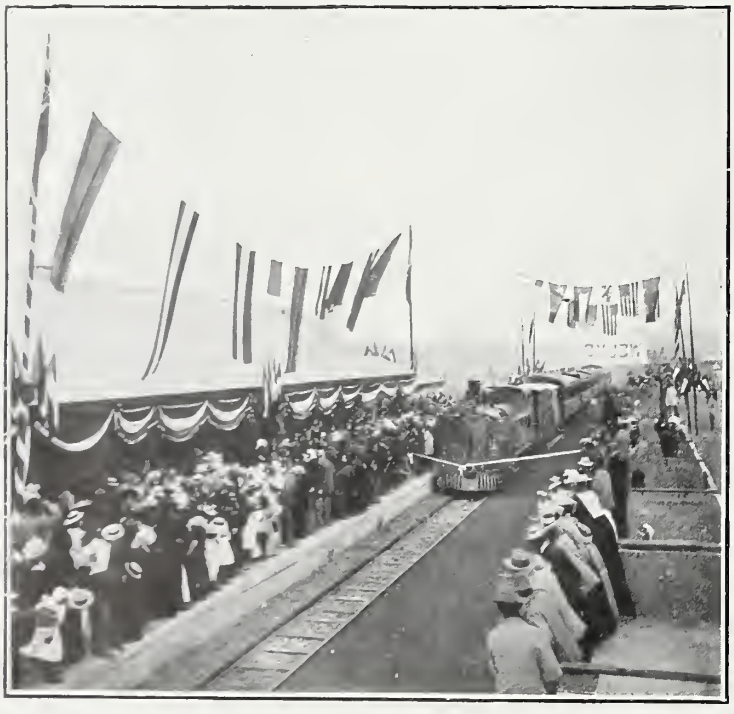
native resistance was overpowered, and Pietersburg, followed by other prosperous towns, became established. The present population of Pietersburg is upwards of 3,200, white and coloured persons in about equal proportions. The town has an elevation of 4,269 ft. above sea level. Many visitors, suffering from the effects of fever, go there from the Low Country to recruit, the Zoutpansberg capital being one of the healthiest in the Transvaal, and possessing several hotels where good accommodation can be secured. The Grand, the Transvaal, the Royal, the Park, the Caledonian, and the Vienna hotels provide for all tastes, and supply vehicles to run to and from the railway station—a distance of nearly a mile from the town—for the convenience of travellers. There are places of worship of divers Dutch denominations, Gereformeerde, Hervormde, and Dopper; also Anglican, Wesleyan, and Roman Catholic Churches. It has been proposed to erect a Lutheran Church as well. There are the usual public buildings and town police quarters; and a site has been granted by the Government, in Maré-street, for the erection of a new town-hall close to the present Government buildings. The Market Square is practically in the centre of the town, which is laid out on a large scale, the houses being very scattered. There is a Poultry Club in Pietersburg, of which the town is justly proud, conducted on very progressive lines, and one of the most influential in the Colony. At the Transvaal Poultry Show of 1905 the members of the Pietersburg Club secured 14 cards out of 20 exhibits put forward by them. Pietersburg

The Municipal Council, Pietersburg, in 1905.

PIETERSBURG.

Market-street.

Maré-street.



First Train entering Pietersburg, June, 1899.

Government Offices.

is also the centre for the district of the Farmers' Association, or Boeren-Vereeniging, which is well supported. It has altogether a total membership of 11,000. The headquarters are at the chambers of Dr. Krause. The Association claims to be non-political, and to officially represent the farming interests of the whole district. It was the first institution of its kind established in the Transvaal after the war, having come into existence in 1902. Since its inception it has proved a valuable and powerful intermediary between the agricultural classes and the Government.

PLOUGHS ON SALE BY MR. B. H. DICKE, PIETERSBURG.

Mr. THENIUS KLEINENBERG.

Mr. Thenius Kleinenberg, J.P., Mayor of Pietersburg in 1905, is a law agent with an extensive practice, and is in fact the oldest member of the profession in the district, having resided in the Zoutpansberg capital since 1887. He is a native of the Cape Colony, where he received his education. During the 1899-1902 war he fought on the Boer side as a burgher, but he accepts the result with a good grace, and is only too ready to give his support and help to the settlement of the country. On the formation of the local Municipal Council in 1903, Mr. Kleinenberg was elected a member, and in the following year had the honour of being raised to the civic chair. Mr. Kleinenberg takes the most serious interest in the progress and welfare of the country, cordially assisting in every measure that augurs advancement and prosperity. His intimate knowledge of the district and its resources enables him to speak on this subject with some authority. He unhesitatingly pronounces it one of, if not the most richly mineralised districts in the Transvaal.

Dr. L. E. KRAUSE.

Dr. L. E. Krause, B.A., LL.B., is a barrister, but practises in Pietersburg as a solicitor. Dr. Krause is the longest established qualified solicitor in Pietersburg, having been in the town some eight years. He is a South African by birth, but he completed his studies in England, and his degrees he obtained at the Cape and London and Cambridge Universities. An enthusiastic and critical member of the local Town Council, he is also Secretary to the Boeren-Vereeniging, or Farmers' Association, and he takes a warm interest in the agricultural and mining areas in the district. Dr. Krause has a charming personality, is keen and alert in conversation, and appears to have that valuable attribute of being able to readily grasp a situation. He is possessed of considerable knowledge of the resources of the district, in which he holds extensive interests. He keeps himself in touch with all the developments of the outside world, and naturally uses his knowledge and experience for the benefit of local requirements.

Mr. HENDRIK MENTZ.

Mr. Hendrik Mentz, solicitor to the Pietersburg Town Council, is of German descent, and was born in the Orange River Colony. He played a part of some prominence in the Anglo-Boer war as chief of General Beyers' staff. In this capacity he served throughout the campaign, and during the operations in the Zoutpansberg district was wounded three times. Mr. Mentz was present at the historic Vereeniging Conference, and when the articles of peace were signed there he settled in Pietersburg, where he now conducts an apparently lucrative practice. Interesting himself in every public movement, he acts on numerous committees, one of the most important of these being the Johannesburg International Exhibition (1907) Committee, on which he represents the Zoutpansberg district.

Mr. JOHN CORNELIUS COGHLAN.

Mr. John Cornelius Coghlan is an experienced attorney, notary, and conveyancer, whose practice is so extensive that he considered it necessary to resign from the first Town Council of Pietersburg. He was born in the Cape Colony, and received his education at St. Aidan's College, Grahamstown. In 1893 he was admitted in Griqualand West, and subsequently practised in Rhodesia. Mr. Coghlan settled in the Pietersburg district at the close of the recent war. He is interested in many mining propositions in the district—*inter alia*, copper, and precious stones. We have it on his authority that from specimens of the latter sent to England one was declared to be a true Oriental ruby valued at £1,500. The subject of these notes is a great believer in the

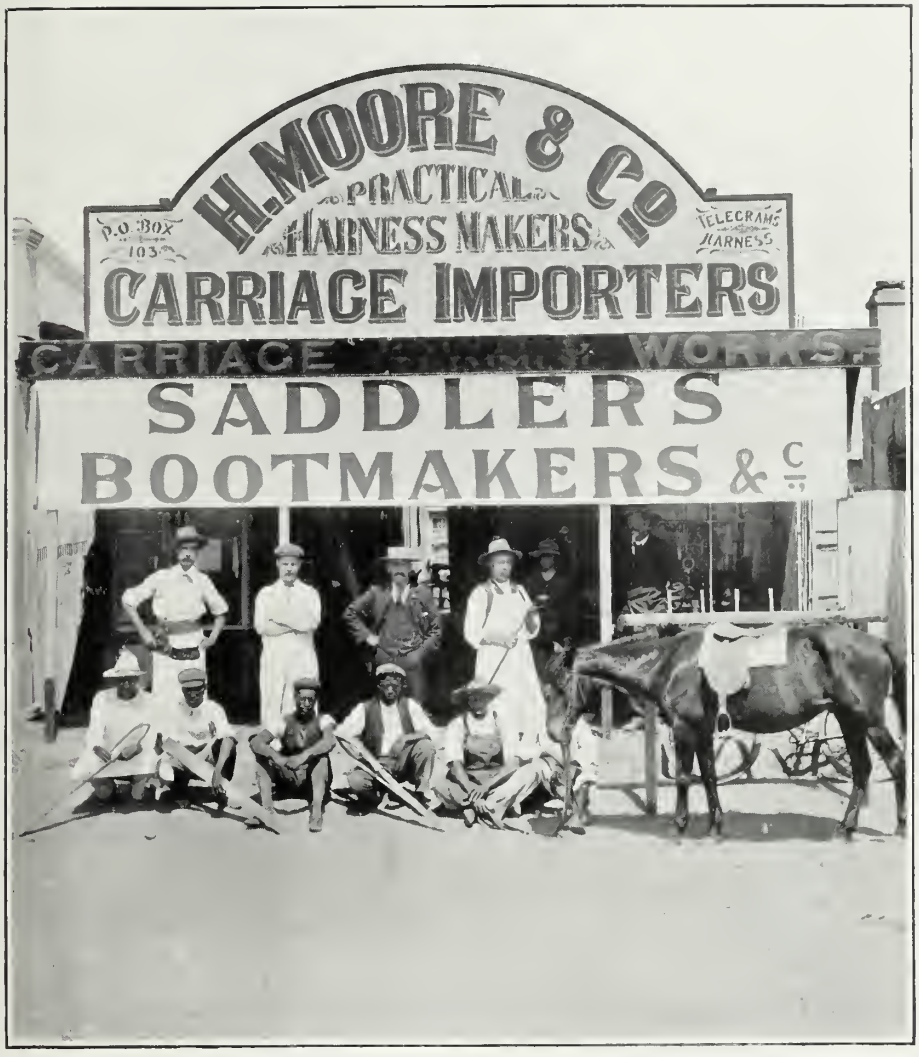
future of the Zoutpansberg district, and takes an active interest in its development and welfare.

THE CALEDONIAN HOTEL.

This hostelry is one of the most popular of those existing in the Zoutpansberg district, and it is one at which no follower of sport neglects to call if his "trek" time permits. Than "Jock" Duncan—as he is familiarly termed by his intimates—there is no more popular Boniface in the Northern Transvaal. He has been a hotel proprietor in the neighbourhood for 15 years, and in the course of that period he has established a pleasing reputation for *camaraderie*. Previously pioneer and prospector, the subject of this brief sketch decided some fifteen years ago upon a settled life, and he selected the now defunct Smitsdorp as the centre of his energies. In that promising dorp he erected the first Caledonian Hotel, at an expense of about £1,000. In those days this was without d ubt the most modern *caravanserai* in the Transvaal Republic, and its construction, appointments, and *cuisine* earned the encomiums among other distinguished visitors of the late Lord Randolph Churchill, who was a guest there during his historic trip through South Africa. But when the Boer Government unexpectedly changed its mind regarding the best site for the leading town of Zoutpansberg, and denied compensation, Mr. Duncan transferred himself and his headquarters to Pietersburg, using much of the material of his previous hotel in the building of his present one. The Caledonian Hotel

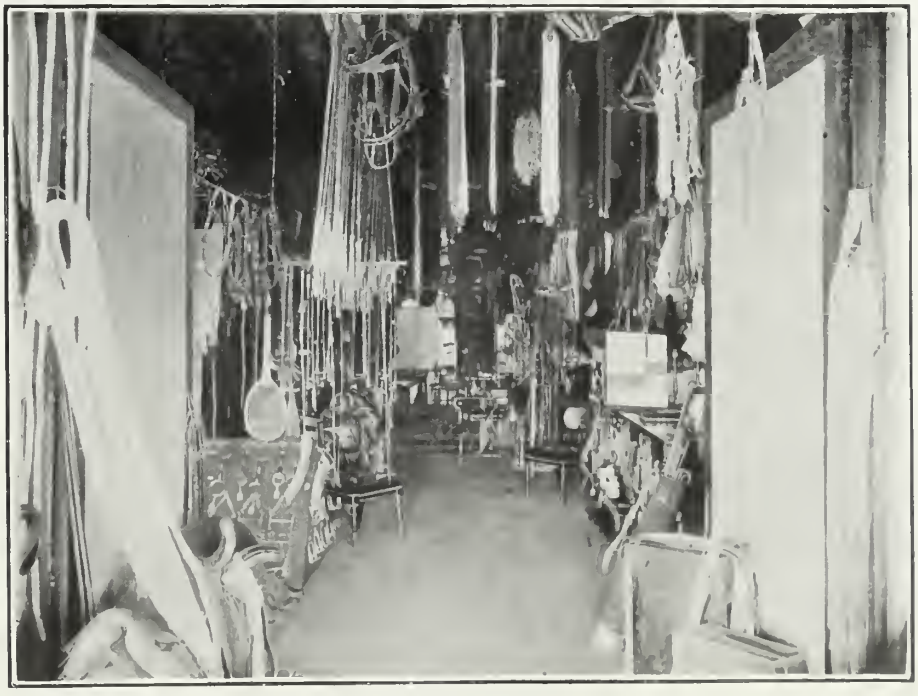
GRAND HOTEL, PIETERSBURG.

1.—The Billiard-room. 2.—The Private Bar. 3.—A cosy Dining-room. 4.—The Entrance Hall. 5.—Exterior view.



Front of Premises of H. Moore & Co., Pietersburg.

has dining accommodation for 80 people, and possesses 16 bedrooms. A noticeable feature in the establishment consists of sets of horns, many of which are the trophies of Mr. Duncan's hunting expeditions. In Mr. Duncan's private apartment are collected many valuable skins of wild animals, in addition to sets of curios in the shape of articles made by the Boers while prisoners of war, and subsequently presented by them to Host Duncan. The subject of this sketch, who has been a sporting enthusiast for many years, is known throughout South Africa as a skilled breeder of race-horses and collie dogs. He owns two ponies that went through the recent war unbranded—possibly the only two with that record—and he also is the possessor of the veteran "Hard Cash," which, now eighteen years old, ran in winning form for ten years with every quoted weight over 12 stone. A photograph here reproduced shows the old racer under the rein-hand of Miss Mary Duncan. This lady is the eldest daughter of Mr. Duncan, and has the reputation of being one of the most accomplished horsewomen in the country.



Interior of Front Shop of H. Moore & Co., Pietersburg.

Mr. B. H. DICKE.

It was inevitable that a district of the agricultural potentialities of Zoutpansberg should one day be specially catered for by a business house devoting its attention mainly to farmers' requisites. The want that had hitherto existed in this regard has been enterprisingly filled by Mr. B. H. Dieke, who in 1903 established himself in his present premises, which front the Market Square of Pietersburg. Agricultural implements of all descriptions and in great variety are carried by this firm, which, in addition, supplies every class of poultry food, seed, and fertiliser. Mr. Dieke imports his goods direct from Germany and America, and the varied developments of his business, which includes the agency for the Munich and Aachen Fire Insurance Companies, extend throughout the whole of the Zoutpansberg district. For expert supervision of such a business natural aptitude and experience are necessary; and it may be remarked in this connection that Mr. Dieke, from fourteen years of farming in the Transvaal, has an intimate and practical knowledge of the requirements and needs of the agriculturist. He has a great belief in the suitability of the district for cotton cultivation, and is supported in his opinion by the report of the Cotton Growers' Association, which, after examining specimens forwarded, has pronounced the quality to be silky, of strong staple, and difficult to replace. Indeed he hopes to handle quantities of this promising product in the near future. A native of Germany, Mr.

Dicke first arrived in South Africa in 1889. He is now a member of the Town Council of Pietersburg—being chairman of the Finance Committee—

Painting Shop, H. Moore & Co., Pietersburg.

and he is also a member of the Committee of the Agricultural Society and of the local Chamber of Commerce.

THE GRAND HOTEL.

The visitor to Pietersburg is invariably pleasantly surprised at finding the town equipped with so superior an hotel as the Grand. It is a two-storey elevation, and has bedroom accommodation for about fifty guests; and there are also a spacious dining room—this apartment is estimated to comfortably seat 120 persons—a private and public bar, and a billiard room fitted with two tables. The social attractions also include a commercial room and a card room; and the bath room and sanitary arrangements are irreproachable. The appointments of the hotel are exceptionally fine, and the service is distinguished by a welcome courtesy. *Cuisine* is a feature which is frequently given slovenly recognition in South African hotels, but it receives careful attention at the Grand, even fresh fish, beautifully served, forming a daily item in the *menu*. The establishment was opened only in May, 1904, and it is now under the personal and experienced proprietorship of Mrs. E. Holmes, of whose expert catering the travelling public have grateful recollections. Mrs. Holmes is ably assisted in the conduct of her business by her manager. The Grand Hotel is a first-class residential and commercial house, and can in every way be highly recommended to visitors to Pietersburg.

Premises of H. Möschke, Ltd., Pietersburg.

MESSRS. H. MOORE & CO.

It can be readily understood that a town which is a railway terminus, and which lies in the centre of a richly mineralised zone, is a usual starting point for the prospector. Then, in Pietersburg of all places, the necessity exists for the dealer in leather goods. Mr. Henry Moore recognised this fact in December, 1902, and he consequently met the requirement by erecting his present premises in Market Square, entering into occupation the following January. Having a thorough training (in Cambridgeshire, the county of his birth in England), he was well qualified to supply the requirements of the neighbourhood in which he is now established, and to-day Messrs. H. Moore & Co. do an extensive business in saddlery, harness-making, and leather work of all descriptions, including boots made on the premises. They are carriage importers, also carriage painters, and trimmers. The site of the establishment has a frontage of 24 ft. with a depth of 240 ft. Behind the familiar showroom and retail shop there is a large yard, around which is ranged a series of workshops. One department is devoted to the manufacture of saddlery and harness, and adjacent there is a spacious room where carriages are repaired and painted. All the tradesmen employed by the firm are Europeans, the rougher handling of material being done by natives under white supervision. If the firm is young, it has proved to be very enterprising and exceptionally capable. There is no doubt that the quality of the workmanship is remarkable, for a place so far in the interior of the country. Of this there is eloquent proof in the possession by Mr. Moore of no fewer than fifteen first and special prizes secured at agricultural shows and exhibitions throughout

South Africa. The firm, it may be remarked, has the sole agency in the district for C. Greatrex & Son (the well-known saddlers and harness-makers). Messrs. Moore & Co. have also a stand on the Market Square, on which they have frequently on market days a display of from 50 to 60 vehicles. The head of this enterprising firm is as versatile as he is energetic. He is a member of the local Chamber of Commerce, of the Zoutpansberg Agricultural Society and the Committee of the Poultry Club (of which latter he is one of the founders); he is secretary to the Pietersburg Choral Society, assistant secretary to the Zoutpansberg Turf Club, and a playing member of the Polo Club. Mr. Moore takes a keen interest in the affairs of the town and district, and is a popular member of the community. He was elected to the Pietersburg Town Council in 1905.

Messrs. H. MÖSCHKE, LTD.

Depôts comprehensively stocked with the necessaries of life are especially desirable in a frontier town, and Pietersburg is excellently served in this connection. Than Messrs. H. Möschke's establishment it would be difficult to name premises more thoroughly equipped in everything that is required in the home, and by the housewife, the farmer, or the pioneer of the veld. It is therefore interesting and profitable to glance at the records which tell the development of this business house. The firm was brought into existence at Pietersburg by the present titular head and Mr. Dewitz in 1885, but it has since been converted into a limited liability company under the style and title given above. The site of the emporium is at the corner of Market Square and Foster-street, and the buildings, which are well designed, cover an extensive area. A distinctive feature is the clock tower—the only one in the town. Of course, commencement was first made in humbler premises—a structure which, though at the time imposing in comparison with its surroundings, was much more limited in dimensions, and, only of single-storey elevation, was composed of brick with cement facings. But the cordial response of the public to the enterprising methods of the firm demanded, with the passing of years, re-construction on a considerable scale; and the existing building is, as our illustrations show, not only commodious but ornately appointed, and a feature in the architecture of the town of Pietersburg. The merchandise attractively displayed in the different departments

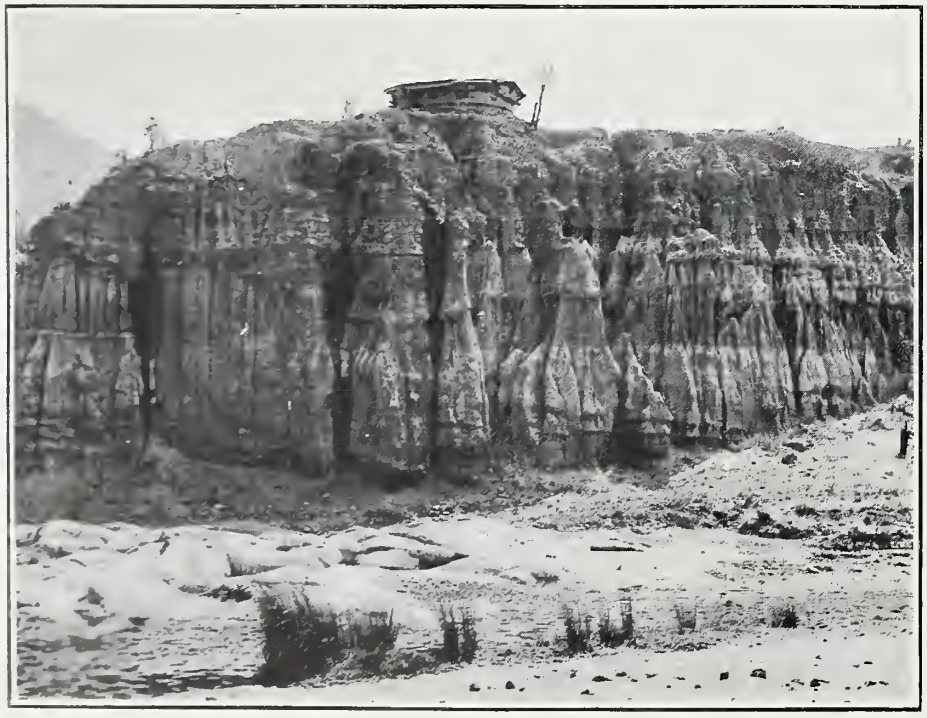
Drapery and Millinery Department, Möschke, Ltd., Pietersburg.

is obviously selected by authorities on the needs of the district's cosmopolitan population, and the migratory prospector and the permanent settler have every requirement catered for. The ground floor is a compact avenued exhibit of various descriptions of the Company's wares, and the organisation is so complete that any of the numerous classes of articles carried can be immediately located. Upstairs there is the most extensive showroom in Zoutpansberg, and there the visitor is usually surprised at the smart stands

Furniture and Fancy Goods Department, Möschke, Ltd., Pietersburg.

of modern furniture, crockery, and glassware, the dainty creations in millinery, and the up-to-date examples of the costumier's art. Messrs. Mösehke, Ltd., also stock fancy goods, provisions, and other lines in an exhaustive degree. The firm is the largest direct importers in the northern district of the Transvaal, and its ramifications extend over 20 branches and business houses which it supports. In addition to the establishment here dealt with, it may be mentioned that Mr. Mösehke personally owns the handsome terrace of adjoining shops; and it is evident from his possession of such a range of buildings that he has great faith in the future of Pietersburg and the Zoutpansberg district. To conclude, it may be added that while Mr. Mösehke is the managing director of the company, the position of acting managing director is in the experieneed hands of Mr. J. R. Webster, who was previously for fifteen years manager for Messrs. A. Fass & Co., Durban.

THE TRANSVAAL HOTEL, PIETERSBURG.



INTERESTING FORMATION NEAR PIETERSBURG.

(Perched on the top may be seen a military blockhouse, erected during the Anglo-Boer war.)

Mr. Webster has resided in South Africa for 26 years. He was in 1905 a member of the Pietersburg Town Council, and Vice-President of the Chamber of Commerce. Messrs. F. G. King and M. E. Steinbaeh are also on the directorate of Messrs H. Mösehke, Ltd.; Mr. G. E. Christopherson fills the position of secretary.

THE TRANSVAAL HOTEL.

The Transvaal Hotel was the first to be opened in Pietersburg, and its existenee dates from 1886. It is a single-storey building, but the area occupied extends to two erven. The dining saloon is well appointed, and can accommodate about 70 guests, while there are the usual addenda of sitting and smoking rooms, and a commodious bar. There are 36 bedrooms in the hotel. Mr. E. Horwitz has the proprietorship of the business, and it may be stated that of the 14 years he has been in South Africa nine have been passed in the Zoutpansberg capital. Previous to taking over the establishment under review in the early part of 1905, he was manager of this business for the Pietersburg Hotels, Ltd. Mr. Horwitz is an experienced caterer and an obliging host, as the commercial community appears to fully recognise; and while he is at the present time eonfining his energies to the conduct of his hotel, he is also tenaeiously holding a number of mineral interests which he feels assured will prove valuable when legitimate eapital is attracted to the district.

Messrs. WOLF & SIMPSON.

Agrieulturists especially are familiar with the name of the firm of Messrs. Wolf & Simpson—auctioneers, farming and general agents. The partners established themselves at Pietersburg in 1904, and in addition to such business as may be included under the head of ordinary commerce, they are interested in mineral properties. Indeed, they are part owners of the Pilgrim's Zand Farm, on which it is reported that true Oriental rubies have been discovered. They also represent the North British and Mercantile Insurance Co. The firm's operations extend throughout the district. Mr. Wolf is a native of the Cape Colony, and was formerly an auctioneer in Johannesburg for some years. Mr. Simpson was born in Natal, and arrived in Pietersburg in 1896. He resigned an accountantship in the Natal Bank at the close of the recent war, to start in the business here described.

Piet Retief.

The township of Piet Retief was founded in 1885, the town lands including some 7,527 morgen, taken out of the two farms "Geluk" and "Osloop." Of this area the township occupies 336 morgen, and the remainder is reserved for commonage. The assessed value of the surveyed erven and buildings in 1905 stood at £50,000. An Urban Board was created in 1903, and municipal powers were granted the following year. The Municipal Council consists of a chairman and eight members. The population of Piet Retief, according to the latest census, was 341 whites and 687 natives and coloured persons. A large number of natives live on the town lands, paying a yearly rental of £2 per hut. They also pay the same amount yearly to the Government as hut tax. The town of Piet Retief was included by the old Government in the district of that name, but since the war, and the cession of part of the Wakkerstroom district to Natal, this portion of the country has been included in the latter electoral division. Incorporated also with those territories known as Piet Retief, was the quaint little corner of land, about the size of three ordinary farms, granted by Umbandine, King of Swaziland, to three Boers, who immediately proclaimed a republic under the title "Klein Vrij Staat" (Little Free State). One of their number, by name Bezuidenhout, was elected President, and the others, with all their sons, were appointed to various "offices of state." They ruled to their own supreme satisfaction over a population consisting of their wives and mothers, and their native servants. This extraordinary little State has now ceased to exist; it became part of the Piet Retief district in 1894. The district is fertile, and rich in minerals, coal, copper, tin and gold being found, though not as yet in large quantities. It is watered by the Assegai, Pongolo, and Usutu Rivers, and at Piet Retief, therefore, a good irrigation scheme for town purposes could easily be contrived, though up to the commencement of 1906 the Council had not felt justified in incurring any debt on this account. No doubt it is a wise decision to wait until large developments take place in the neighbourhood, and then to inaugurate a comprehensive scheme which the town's financial resources will then be prepared to meet. An interesting feature of the first distribution of the town lands was the gift of "burghers' rights" erven to all burghers who had settled in the country prior to 1872. The town was surveyed off into lots, the first section by Mr. C. R. Von Welleigh in 1885, the second some years later by Mr. R. Pizzighello. The first allotments were called town erven, and were 240 ft. in length and of the same width measurement. Four of these erven were apportioned to each burgher, instead of a farm, in return for services rendered during native wars, or other services rendered the State. A large game preserve has been established by the Government on eight farms, on the Zululand frontier. Fruit of every description is grown in the district, from oranges to strawberries. The Limeburg oranges, grown by the German settlers, are considered to be the best in the Transvaal. Tobacco is also cultivated in large quantities, soil and climate being peculiarly adapted to the raising of this plant. Cotton-growing, it is also anticipated, will be a great industry in this portion of the Colony in the future.

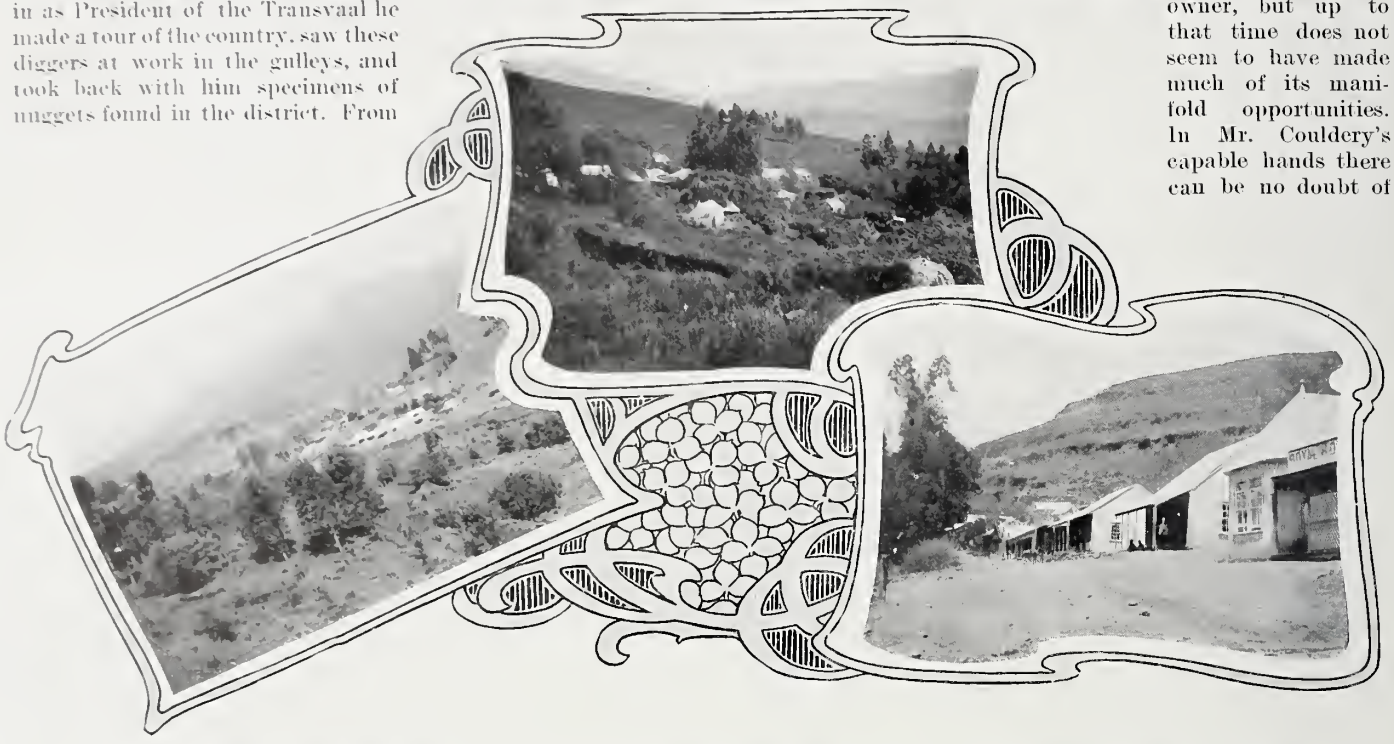
Pilgrim's Rest.

The Transvaal Gold Mining and Estates, Ltd., owns a concession which embraces some two hundred square miles of the district of Lydenburg, where the little mining station of Pilgrim's Rest is situated. Practically the whole town is within this concession, and the inhabitants hold their stands and the diggers their claims under tenure from the Company. The concession was first granted to Mr. David Benjamin in November, 1881, and was ceded to the present Company in 1893. The working operations are very extensive, and of great interest, consisting of a group of five actively working mines, the Clewer, Jubilee, Beta, Chi, and Peech-tree, besides two others which are now being opened up. The business was set on foot in 1895. The formation consists of true fissure veins lying horizontally in the dolomite, the dolomites being of payable quality and extending over the entire area. Two mills are working, one of which is on the Chi mine, where the ore is treated in a twenty-stamp battery, which battery is driven electrically from the central station, three miles away. The central mill has a battery of sixty stamps, and there is approximately seven miles of tram lines along which the ore is electrically hauled to the central works. This installation is the largest of its kind in South Africa in any district outside the Witwatersrand. Both at the Chi mine and at the central works there is a complete equipment for the treatment of sands and slimes, the Siemen and Holske process, in use at the central station, being found exceedingly satisfactory owing to the presence of copper in considerable quantities in the ore. There are at the central works forty-one iron tanks, of sizes ranging from sixty to two hundred and five tons, for the treating of sands and slimes. The gold is of fine quality, and the resources of the Company appear to be unlimited. The present monthly output is from 2,600 to 3,500 ounces. On the Beta mine there is a feature that calls for special mention, which is that the narrowest mining in hard rock ever known to be undertaken is carried on here. From six to nine inches of ore,

The Clewer Fall, Pilgrim's Rest.

between solid dolomite hanging and foot walls, is extracted, and this is recognised as unique. There is of course a wider vein in this mine, which is in any case one of the narrowest workings; and that successful mining should be done at these dimensions is remarkable. In the other mines the lode varies from one to twelve feet in thickness. As many as one hundred and twenty white men are employed on these mines, exclusive of contractors, and there are upwards of two thousand four hundred native labourers. The general manager is Mr. Leggett Neale, who for the past ten years has been manager of the Glynn's, Lydenburg. The Pilgrim's Rest mining camp first existed as alluvial diggings, and the original discoverers

were a party of Australian diggers who recognised the possibilities of the spot and made it their camping ground. Shortly after Mr. Burgers was sworn in as President of the Transvaal he made a tour of the country, saw these diggers at work in the gulleys, and took back with him specimens of nuggets found in the district. From



Pilgrim's Rest from the West. Pilgrim's Rest from the East. The Street, Pilgrim's Rest.

that time these alluvial beds have been visited and worked. The deposit is very rich in places, and as many as three hundred diggers at a time have made a living from them. Alluvial workings are still carried on here under permission from the Transvaal Gold Mining Estates Company, this permission being indispensable before digging can be commenced, as the Company often require all the available water supply for their larger and more important works.

MR. G. E. COULDERY.

In the heart of the mining settlement of Pilgrim's Rest is a pharmacy store, the property of Mr. Couldery, pharmaceutical chemist and assayer. The business was established before it came into the possession of the present owner, but up to that time does not seem to have made much of its manifold opportunities. In Mr. Couldery's capable hands there can be no doubt of its prospects, and the need of some such institution in these distant mining communities, far removed from centres where good hospital treatment is obtainable, is self-evident. Mr. Couldery is one of the newer arrivals in the country. He began his experience of South African life in 1902, and took up his residence in the Transvaal as lately as 1905; but in spite of being a comparatively new arrival he has gauged with accuracy the needs of the district and its possibilities, and is fully prepared to provide for both. He has stocked his dispensary in the most complete fashion with all the modern requirements and resources of his profession, and he is moreover endeavouring to obtain assaying work in connection with the mining properties of the neighbourhood. This branch of the business should be as profitable as it is enterprising. Mr. Couldery possesses considerable personality, and shows, in capably grappling with business difficulties and problems, a spirit and decision that go far to ensure success.

KOVENS KRAAL, NEAR PILGRIM'S REST.

THE EUROPEAN HOTEL.

In 1883 this hotel was built at Pilgrim's Rest. It occupies a central position in the Pilgrim's Creek. It passed into the hands of Mr. F. Gibson,

who eventually, in 1897, disposed of the property to the present owner, Mr. Stein. From the time the establishment was taken over by the latter many improvements have been introduced, and the hotel now answers all requirements. There is good accommodation for man and beast; a dining-room, reading-room, billiard-room, nine bedrooms, and bath-room, being provided for visitors within, and stabling for twenty horses without——the latter being almost as important an item in those regions as the former. The house is largely patronised by the local community, and to the travelling public it is invaluable. Mr. Stein is a native of Germany. He has made South Africa his home since 1883, having spent all but two years of that time in the district of Lydenburg. In his hands the business of the European

description here given had perforce to be compiled from such information as was available. About the year 1836 Pieter Potgieter, at the head of a party of Boer trekkers, made a camp at a place about six miles north-east by north higher up the Mooi River than where Potchefstroom now stands. The site became afterwards known as Oldorp. Farms were allotted to the leaders of the trek, and Wilkopjerfontein was the name given to the farm on which the first settlement was formed. Investigations of the surrounding country speedily showed that there was a more suitable spot for a town site lower down the Mooi River, and in 1839 the site was selected upon which Potchefstroom was founded. One of the first matters dealt with in connection with the town's formation was the allotment of a commonage of

still resided in Potchefstroom in 1905. The country he passed through on his journey was full of game, and he recollects many exciting incidents of the chase on his way into the interior. On reaching his destination Mr. Van der Hoff found there was no work for him in his profession. He therefore for a period of two months travelled with his brother to the various centres where it had been advised that church services would be held. These took place in laagers in the open air. Mr. Van der Hoff endeavoured to arrange with the settlers to have their farms surveyed, but he met with no success. When he had been some six months in the country he met with an exciting adventure. The Vaal River, which he and his brother had to cross on one occasion, was high in flood, but they extemporised a means of transport. In

The European Hotel, Pilgrim's Rest.

Billiard-room, European Hotel, Pilgrim's Rest.

Hotel has greatly increased and prospered. None but those who remember the comfortless days when hotels were not in existence can fully appreciate the convenience of such a house of call.

Potchefstroom.

To write a complete history of Potchefstroom, giving the various dates and statistics of the historical events connected with its foundation, is practically impossible, owing to the absence of authoritative records. Much has to depend upon personal narrative of veld residents, and the

considerable proportions. This originally comprised no less an extent than 29,000 morgen. With the exception of occasional levies or commandoes being raised from time to time against the native tribes, no events of great importance occurred for many years. The country was governed by Commandant-Generals, each township having its Landdrost. In the early fifties, the Rev. Mr. Van der Hoff, founder of the Dutch Reformed Church in the Transvaal, arrived from Holland. He was joined by his brother, Mr. Martinus Johannes Van der Hoff, in 1856. The latter gentleman, a surveyor by profession, took 72 days on the voyage from Rotterdam to Capetown; thence 15 days to Durban, and a further trip from Durban to Potchefstroom by wagon, of 30 days. Mr. Van der Hoff

attempting, however, to cross another river in a similar swollen state, they were not so successful, Mr. Van der Hoff being washed off the wagon, and only succeeding in gaining the bank after being carried down the river a distance of two miles. Mr. Van der Hoff was appointed clerk to the first Landdrost of Potchefstroom, with the added position of postmaster, at a salary of £75 per annum. It was he who designed the *vierkleur* (flag of the Transvaal Republic), together with Mr. Schubart. Probably, as Mr. Van der Hoff himself explains, he was selected because he was in possession of possibly the only box of colours then in the country! At this period Messrs. M. W. Pretorius, Schoeman, and others from the Lydenburg district were the Boer leaders. Differences of opinion

arose between Pretorius and Paul Kruger, resulting in a battle being fought on the spot now occupied by the military cantonments at Potchefstroom. In this engagement a few men were shot, and Kruger succeeded in capturing the cannon of his opponents. Mr. Van der Hoff was actually commandeered by both sides, but as he could not serve two masters he remained at home throughout the struggle. The principal stock in the early days of the old Boer settlement consisted of cattle, immune from disease prior to the importation of breeding cattle from the Cape Colony. Later articles of trade were introduced, including ivory, leather, and ostrich feathers. Potchefstroom became in time the chief commercial centre, and capital town of the Boer Republic, and the spoil brought down from the far interior by intrepid hunters could be seen displayed on market days. Sheep were afterwards introduced, and wool in small quantities sent down country. Mr. Van der Hoff was master of the powder magazine at Potchefstroom about 1860.

Potchefstroom to-day is one of the prettiest townships in the Transvaal. The surrounding country is rich in agricultural soil, which in a measure is evidenced in Potchefstroom itself by the luxurious growth of trees lining its footpaths, and foliage visible wherever the eye rests. The ancient capital is laid out on the usual plan of Dutch townships. The main street is now named after His Majesty the King. In King Edward-street there are many pretentious buildings occupied as mercantile and retail stores, banking offices and hotels. The township is well favoured in regard to the latter. This may be largely due to the fact that the environments of Potchefstroom are picturesque and attractive, and the town has the pleasing reputation of being the centre of the garden of the Transvaal. It is therefore likely to become the objective of many visitors and tourists. Much may be said in praise of this picturesque and pleasantly-situated town as a health resort. During the visit to South Africa of the members of the British Association, in the early part of 1905, some interesting information in this regard was submitted to the distinguished visitors in pamphlet form by G. Hay Reynolds, M.R.C.S., of Potchefstroom. Dr. Reynolds, who as a resident on the spot has given considerable study to the question, adduced mortality statistics showing an extremely low death-rate. He points out that Potchefstroom offers every requirement conceivable to put a lung or a heart case under the best possible conditions. With an altitude of 4,122 ft. above sea level, practically 2,000 ft. lower than Johannesburg, where the altitude throws a great strain on the heart, he had found that

The late Mr. M. A. Goetz, a pioneer resident of Potchefstroom.
(From a painting. Photo: Mr. Fred Coop, Potchefstroom.)

heart cases improved directly they came there. Dr. Reynolds also had something to say of the inexpensive cost of living in Potchefstroom, of the practically perfect water supply, and the pleasant surroundings in which the houses are situated. On the Market Square of Potchefstroom are the Post

Mr. M. A. Goetz, J.P., the first Mayor of Potchefstroom.

Office and Magistrate's and District Court in one block of stone buildings, forming an attractive pile. The Potchefstroom Club, situated on the Market Square also, and facing the Government Buildings, is a well-appointed and comfortable institution. The local golf links and the Golf Club house are among the finest in the country. The "royal game" forms a pleasing pastime to visitors, who can be enrolled as temporary members. Of the hotels, the King's, which is on the Market Square at the corner of King Edward-street, is a prominent block. The establishment is beautifully decorated and designed throughout. The *cuisine* in this hotel is conducted upon German lines, but nothing is left to be desired respecting the accommodation and attendance. English visitors may perhaps prefer the Royal Hotel, situated in King Edward-street. This is under good management, and is an extremely well-appointed establishment, where the visitor can find English cooking and an excellent table. The Royal does a large family and commercial business. The Queen's, while not quite so pretentious, is also one of the popular hotels of the town. The dairying industry is likely to make forward strides in the Potchefstroom district, and an impetus has lately been given in this direction by the establishment of the Potchefstroom Dairy Supply Company, Ltd., which has a distributing centre in Johannesburg. The Company's Potchefstroom factory has a cooling chamber where the milk is pasteurised. Fruit grows abundantly in the district, but to a large extent crops go to waste on account of preferential railway tariffs with the other colonies placing local growers at a disadvantage. Were the tariff amended, doubtless canning and jam factories would be established with profitable results to those engaged in the industry. Potchefstroom has its Choral and Dramatic Society, which has a numerous membership, and occasionally gives public performances. The town and district is served by four newspapers. There is a good train service connecting with the capital and with Johannesburg. This would be considerably improved by the connection of the Cape Colony mail service which was to be made prior to the publication of this work. Daily markets are held on the Market Square of the town. The commonage of Potchefstroom was estreated by the late South African Republic just prior to the war. This, however, has reverted to the town, less some 7,000 morgen reserved for military cantonments and the camp of the South

POTCHEFSTROOM.

1.—St. Mary's Church. (Figures: Bishop of Pretoria and Archdeacon of Potchefstroom.)
2.—The "Dopper" Church (new and old Buildings). 3.—The Dutch Reformed Church, Market Square.
4.—The Convent. 5.—Alexandra Park.
6.—The Park furrow. 7.—Potgieter-street (the original main thoroughfare).

African Constabulary. The municipality had in contemplation in 1905 the installation of electric lighting for the town, a scheme to cost from £10,000 to £15,000. The funds to be so applied were to come from the proceeds of sale of land to the Government in connection with the Mooibank settlements—an amount of £21,000. Tenders were also being called for the equipment of a municipal fire brigade. The Mooi River bank settlement is, as its name implies, on the banks of the Mooi River, where are also situated Government experimental farms. These are shown in the illustrations appearing in this article. A burning question which has exercised the farmers and settlers about the Mooi River has been that of irrigation water rights. A Commission—consisting of Messrs. M. A. Goetz (Mayor of Potchefstroom) and J. E. van der Merwe, Drs. G. Hay Reynolds and J. C. Ramsey—was appointed to investigate the whole question, and its report was submitted to the Lieut.-Governor, Sir A. Lawley. The Commission recommended that the title-deeds of all irrigable farms along the river should be called in, and that an adjustment of water rights, apportioning especial riparian privileges, should be issued on fresh titles. Many of the farmers based their rights on the old Roman-Dutch law, consequently this question was a difficult one to deal with. In justice to the less favoured, the recommendations of the Commission appear to be well grounded, and to constitute a sensible solution of the vexed problem. Potchefstroom is the educational centre for the Western District. Potchefstroom College, for the higher education of boys, is the principal scholastic establishment of the town. The College was formally opened on January 21st, 1905, by Sir Richard Solomon, K.C.M.G., Attorney-General (then Acting Lieut.-Governor of the Transvaal). It was built by Government on 40 acres of ground presented by the town. The College is controlled by a local Committee working under the Education Department. The style of architecture of the building is a modified form of Flemish. The architect was Mr. Bevan, late of the Public Works Department. The financial working of the College was guaranteed by the Government for the first two years. The Principal is Mr. C. D. Hope, M.A., Trinity College, Oxford (formerly of S. Andrew's College, Grahamstown, and headmaster of Jeppestown High School). The staff is composed of University men. The number of pupils on the roll at the end of 1905 was 105, with an average attendance of 99. A house for boarders which had been opened under the supervision of the Vice-Principal (Mr. P. M. Druce, M.A.) has accommodation for 24 boys in a large building facing the playing fields. The governing body of the College consists of the Resident Magistrate, the Inspector of Schools, six representatives elected by the parents of pupils and the benefactors of the College, and two members nominated by the Lieut.-Governor of the Transvaal. The College cricket team has already taken a high position in the Colony.

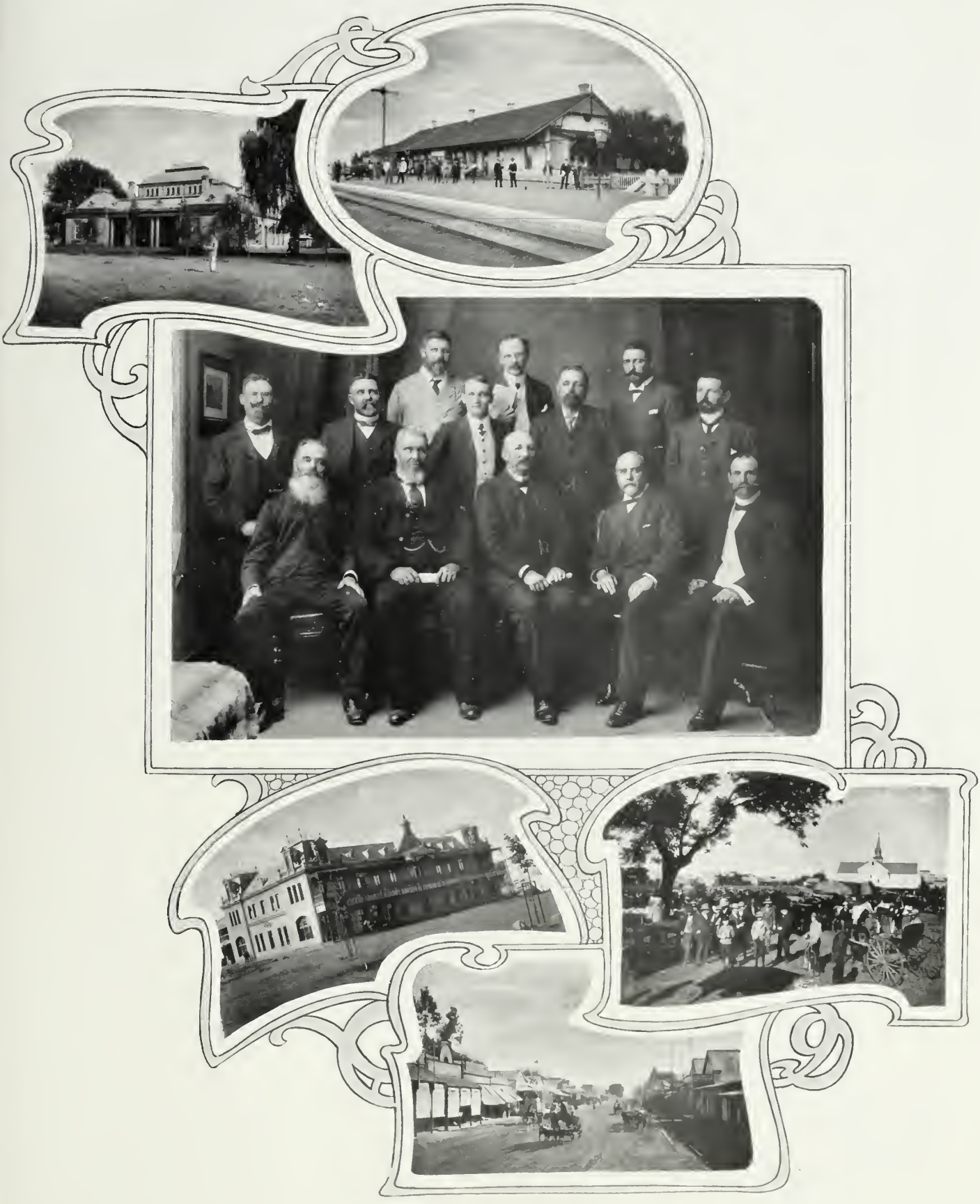
The Potchefstroom High School for Girls has been very successfully inaugurated by a local Committee working under the Education Department. Miss Burton, the Lady Principal, has long held a high place among the schoolmistresses of South Africa.

THE CHAMBER OF COMMERCE.

There was a Commercial Chamber in the township of Potchefstroom 20 years ago, but the existing Chamber was not established until October 10th, 1901, during the war, being inaugurated under the authority of the Military District Magistrate. It was of great assistance to the authorities as an advisory board, and to the townspeople as a means of getting forward supplies under difficult conditions. The Chamber was largely instrumental (in conjunction with others) in helping to restore to its normal conditions the railway system, which was for a long time entirely under military control, and consequently—from the civilian point of view—very much dislocated. Since then it has kept a watchful eye on all matters affecting the trade of the town. In a country which is being built up anew, and where legislation in some directions is largely of an experimental nature, the experience of members has been no doubt useful to those in authority, by whom advice from the Chamber has been graciously received. There is as yet no staple industry or established factory in Potchefstroom, and the community is but an agricultural and trading one, whose main outlet for local agricultural and pastoral products is the Johannesburg market. With a return of prosperity it is likely that the district may see the establishment of jam-making, fruit-canning, and tobacco-curing. The dairying industry, which has been given an impetus by the establishment of a pasteuring factory, is capable of large development. The policy of the Chamber is to afford what information it can to enquirers abroad as to the prospects of the district, to foster by every means in its power the development of trade, and to assert the prominence of the town of Potchefstroom as a health resort second to none in South Africa. The following gentlemen comprised the officials of the Chamber in 1906:—Chairman, Mr. J. A. Bonebakker; vice-Chairman, Mr. J. J. Hartley; treasurer, Mr. W. A. Dugmore; secretary, Mr. W. Vernon Johnstone. In addition to the above-named there were also on the Executive Committee Messrs. Glen. W. Scorgie, C. V. Bate, F. G. Edgell, and H. Studden. The members of the Chamber numbered altogether about 50.

MR. P. FERRERO.

Mr. P. Ferrero, who was unanimously elected to the mayoral chair of Potchefstroom in October, 1905, is a gentleman who has given much of his time and abilities in advancing the interests of the municipality. His election was therefore a popular one. He is the head of a business which, since he first went to Potchefstroom, he has built up to considerable proportions. As a commencement, a start was made with a bakery and confectionery establishment, which was added to by the future Mayor, and later included a sweets factory and grocery store. In 1899 another departure was made, and a mineral-water factory became part of the business. This covers commodious premises on part of the block—having a frontage space of 120 ft. to King Edward-street—and includes the various branches of Mr. Ferrero's well-known establishment, the balance of which is let off as shops. The mineral-water factory is equipped with Barnett & Foster's machines and other patent appliances for the bottling, preparation, and output of the various kinds of "minerals." A 6 h.p. Tangye oil engine is used, and the factory's capacity is 2,500 dozen bottles per day. An artesian well on the premises supplies the water used. A glance through this department indicates that care, cleanliness, and good management are the keynotes to the success which this and other of Mr. Ferrero's establishments have attained. In addition to his position as municipal councillor, the head of this firm is a member of the Chamber of Commerce, a director of the Potchefstroom Permanent Mutual Building Society, and chairman of the Potchefstroom Steam Laundry Company. Mr. Ferrero's business aptitude and valuable qualities as a public man have secured the respect of his fellow-



POTCHEFSTROOM.

1.—Government Buildings. 2.—Railway Station. 3.—Town Council, 1905.
4.—The King's Hotel. 5.—Early Morning Market.
6.—King Edward-street, the main business thoroughfare.

townsmen. That his time is full and profitably taken up is indicated from the fact that, in addition to offices held by Mr. Ferrero which have been already mentioned, he is President of the Society for the Prevention of Cruelty to Animals, vice-President of the Potchefstroom Operatic Society, and vice-President of the Potchefstroom Poultry Club.

Mr. P. Ferrero's Mineral Water Factory, Potchefstroom.

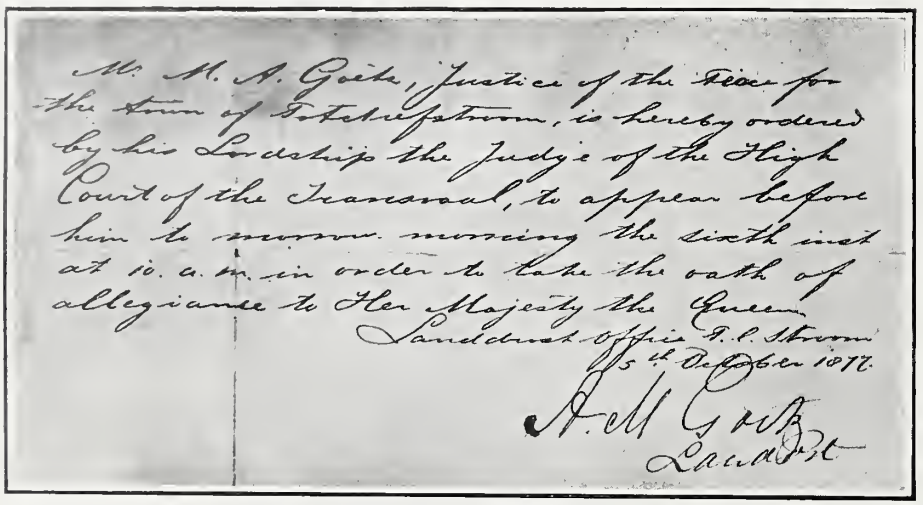
MR. F. D. CONRADIE.

Mr. Francois Daniel Conradie, a member of the Potchefstroom Municipal Council, is a native of Worcester, Cape Colony, where he was born in 1867. He was educated at the Boys' Public School, Worcester, and the Blauw Vallei Public School, Wellington. On leaving school he was first engaged as a store assistant, but in January, 1888, became a pedagogue in the district of Cradock, where he remained until September, 1889, when he proceeded to the Transvaal to be articled to Mr. J. N. de Jongh (at present of Messrs. Lewis & Marks'). Completing three years' articles with Mr. W. E. Holland, Mr. Conradie in 1893 joined the branch office of Messrs. H. Eckstein & Co. in Pretoria, and was admitted a member of the side bar in that year. In 1895 Mr. Conradie joined the office of Mr. J. A. Neser, of Klerksdorp. In 1896 he opened his own office in Wolmaransstad, but finding there was no field for his work he moved to Potchefstroom in August, 1896, and started on very meagre capital. Since that date up to the time this was written Mr. Conradie worked his way through his own independent exertions, encompassing severe struggles. Owing to his expression of opinion as to corrupt practices in the Landdrost Court prior to the war, Mr. Conradie was twice refused the right to practice in the Court. On the first occasion the Landdrost withdrew the order; on the second occasion Mr. Conradie applied to the Supreme Court, but was re-instated before the appeal came on, and the Landdrost had to pay the costs. Mr. Conradie married, in 1895, Miss Van Heerden, of Cradock. In 1894 he was commandeered to take part in the expedition of the Boers against the Kafir Chief Malaboch. He was then still an uitlander, but having made the Transvaal his home he raised no objections to the impressment. Mr. Conradie was spokesman of a deputation which interviewed President Kruger with a view to obtaining payment from the Government for the commandeered uitlanders, but although the President gave the deputation a very fair hearing, and discussed the matter at some length, the object of the interviewers was not gained. During the Malaboch campaign Mr. Conradie was nearly in serious trouble on account of some remarks he made about the cowardice of certain of the Boer officers, who in his opinion were very much in evidence when talking and commissariat were entailed, but not so when there was fighting to be done. On the completion of the campaign an amount was voted by the Volksraad for payment, and those who took part received each about £13, and the uitlanders were given the full franchise. Mr. Conradie in that way became a full-fledged burgher of the Republic after five years' residence in the country. Before the war with the British Mr. Conradie expressed his disapproval of many acts and the general policy of the Government, and earned thereby the reputation of being a "Jingo" and "Rooinek," but on the outbreak of hostilities his action proved to the contrary. He was a despatch-rider in the corps raised by the Commandant Theron—as fine a scout as the Boers ever had. On the western border Mr. Conradie's section of despatch-riders was virtually done away with by the leader Piet Cronje, who reached the climax of his known obstinacy and incapacity as a General at Paardeberg. Mr. Conradie was wounded on the 15th February, 1900, and became a prisoner of war. He returned to Potchefstroom on the 30th August, 1902, and was appointed manager of the Potchefstroom Board of Executors. In January, 1903, he resumed his professional practice in the township. Mr. Conradie was elected Councillor for Ward No. 1 in December, 1903, was defeated in the election of 1904, and was re-elected a Councillor, in the vacancy caused by the resignation of Mr. G. M. Slade, in March, 1905. Retiring by rotation in October of that year, Mr. Conradie was again elected for a period of three years. He is a member of the Finance Committee, and in all municipal matters is keen for the advancement, improvement, and beautifying of Potchefstroom, with its valuable attractions as a health resort. In his younger days Mr. Conradie was a keen sportsman, and was considered one of the fastest sprinters of the Western Province (Cape Colony), and later in life also of the Eastern

POTCHEFSTROOM.

1.—The North Drift.
2.—On the fine Grass Links of the Potchefstroom Golf Club.
3.—The Old Mill and North Bridge.
4.—River Street.
5.—The Mooi Riverside.
6.—The Vlei: reeds on the Mooi River.
7.—The Potchefstroom Club (the Building stands behind magnificent Willows).
8.—A Street in the Native Location.

Province. A keen Rugby player, he took part in cup matches since his 17th year. Mr. Conradie still takes an abiding interest in sport, but his own exercises are confined to shooting, riding, and motor-cycling. As an old burgher of the Boer State, Mr. Conradie's views and opinions on present-day affairs are of interest. He admits an appreciation of the tendency and endeavours of the Government, but expresses a hatred of the "bungling by imported nincompoops" who are more often than not "pitchforked into Government offices in preference to better and superior local talent." In that, Mr. Conradie fears, he detects the utter failure of good administration, which will only be rectified by responsible government in the Transvaal Colony, when "administration will be in the hands of men who understand the requirements of the country." Mr. Conradie is a member of "Het Volk," and is proud of the fact that he will remain "brother Boer" to his dying day. He is quite ready, however, to advance the value of co-operation with the English section, the object of that being real progress; "provided" (Mr. Conradie confides to his interviewer) "there is no longer the desire and attempt to *keep the Boer down*," a policy which, Mr. Coradie considers, "is now very cleverly being pursued by a certain section, supported by their paid newspapers."



Mr. M. A. Goetz, Justice of the Peace for the town of Potchefstroom, is hereby ordered by his Lordship the Judge of the High Court of the Transvaal, to appear before him to-morrow morning the sixth inst at 10. a. m. in order to take the oath of allegiance to Her Majesty the Queen.

Landdrost Office P. R. Stroom
5th October 1877.

A. M. Goetz
Landdrost

An interesting Official Document.

Summons issued by Landdrost A. M. Goetz in 1877, on his brother, Mr. M. A. Goetz, to appear before him in order to take the Oath of Allegiance to Her Majesty Queen Victoria.

Mr. FREDERICK PETRUS CROTS.

Mr. F. P. Crots, M.A., LL.B. (Cantab.), established his solicitor's practice in Potchefstroom in 1903. Prior to this, between 1898 and 1899, he practised in Pretoria as an advocate of the High Court of the South African Republic. During the military control of Johannesburg Mr. Crots practised before the military tribunal, and was counsel for the defence in the celebrated case Regina *versus* Broeksma. He has not, however, always followed the legal profession. His scholastic career has been most interesting. He came out first in 1886 in the Victoria College section in intermediate B.A. (subjects, literature and philosophy); in 1887 graduated; in 1888 was appointed associate rector of the Gymnasium, Pretoria, remaining there until October, 1891, when he took the Latin and Dutch chair at the Normal College, Capetown. In 1892 Mr. Crots was appointed Inspector of the Government Schools of Johannesburg, Potchefstroom, and the whole of the West Transvaal. Differing with Dr. Mansvelt (head of the department) on the Education Bill, Mr. Crots resigned his appointment, and accepted the headmastership of the first-class public school at Malmesbury, Cape Colony. Owing to a severe family bereavement, he decided to visit England, and proceeded to Christ's College, Cambridge, in September, 1896. On the 8th December in that year he came out third in the Inter-Collegiate, took his first tripos in law in May, 1897, and was capped in June of the following year. Mr. Crots returned to South Africa in July, 1898, and in August was admitted as advocate of the Supreme Court of the Cape Colony. In 1897 he studied international law in Strasburg, and is recognised, more especially among the Boer community, as an authority on that subject. Mr. Crots was the last Attorney-General of the Vryheid circuit in September, 1899. He is still enrolled as an advocate of the Cape Colony. On the 14th October he was admitted as advocate of the High Court of the Transvaal Republic, and acted in that capacity until the outbreak of hostilities. After the proclamation of Lord Roberts he practised, as above stated, before the military tribunal. Mr. Crots was elected to the Municipal Council of Potchefstroom in October, 1905, and speedily made himself one of its foremost members.

Mr. M. A. GOETZ.

The history of Potchefstroom would scarcely be complete without reference to the Goetz family, of which Mr. M. A. Goetz, J.P., is a respected representative. Mr. Goetz, it is interesting to note, was not only Potchefstroom's first Mayor during the present British *régime*, but was also the first townsman to be elected Chairman of the old Stadsraad, following the annexation by England in 1877, when he had the honour of presenting Sir Theophilus Shepstone with an address of welcome. After serving the town for two years he vacated the mayoral chair in October, 1905. During his period of office he rendered signal service to Potchefstroom, none of which was perhaps of greater value than as a member of the Water Commission, sittings of which extended over several months. After resigning from the Council Mr. Goetz was gazetted a Justice of the Peace. Mr. Goetz comes from a very old family of settlers who came to the Cape Colony from Europe as far back as 1787. His father, Mr. M. A. Goetz, sen., settled with his family in the old Transvaal capital in 1850, and entered upon mercantile pursuits. The subject of this notice also followed a commercial career for some 12 or 14 years. After retiring from business he took up his abode at Sea Point, in the Cape Peninsula, and there resided for 10 years. He returned to the Transvaal subsequent to the Jameson Raid, and, having been one of the early directors of the Potchefstroom Board of Executors (which was formed about 1875) he again took an active part in its affairs. The business of the Board was resumed in April, 1902, after its operations had been suspended for a period of three years during the war. Mr. Goetz then assumed the general management. The father of Mr. Goetz was a member of the Executive Council of the early

Boer Republic in the days of Pretorius, and in the latter's absence sometimes acted as President. He was Master of the Supreme Court—or the "Orphan Chamber," as it was then called—for Potchefstroom, only resigning in 1881, when the Boers threw off their allegiance to the British. He received a pension from the British Government up to the time of his death. Among our illustrations is one of an interesting document in the form of a copy of the summons issued by Landdrost Goetz to his brother, for the latter to appear and take the oath of allegiance to Queen Victoria. Mr. M. W. Goetz, another member of this historic Transvaal family, and son of the ex-Mayor of Potchefstroom, is an attorney, notary, and conveyancer. He is manager of the Board of Executors, and practises as notary in his private capacity.

The new Gallery of Mr. Fred Coop, Photographic Artist, Potchefstroom (interior).

the Western Transvaal from 1860 to 1869, and was appointed conjointly with Mr. J. H. M. Struben, of Pretoria, the latter taking the northern section. The duty of these gentlemen was to administer the estates of deceased burghers. On his father's resignation in 1869 Mr. M. A. Goetz acted in that position for nine months. He has now in his possession a unique document bearing the name of the old Government, thanking him for services rendered in that capacity, the letter being signed "M. W. Pretorius, President, and B. C. E. Proes, Govt. Secretary." A brother of the ex-Mayor of Potchefstroom, Mr. A. M. Goetz, was a member of the first Volksraad, and was subsequently for 13 years Landdrost of

Mr. FRED COOP.

Mr. Fred Coop, photographic artist, who established himself in Potchefstroom in 1904, arrived in the Colony with a high-class London reputation, having carried on his profession in the English metropolis for several years. In his studios at Brixton Hill Mr. Coop had the honour of attending upon an aristocratic *clientèle*, and he has photographed the King and Queen and several members of the Royal Family.

Exterior of new Gallery of Mr. Fred Coop, Photographic Artist, Potchefstroom.

He gave up his studios in London, and proceeded to South Africa for health purposes. Mr. Coop was advised to locate himself in the district of Potchefstroom, where the climate is congenial to chest troubles. He need not concede first place as an artist to any other member of the profession in the Transvaal. He holds diplomas (London) 1899 and 1900; diplomas and silver medals (highest awards) Birmingham 1895, Nottingham 1896, Birmingham 1897, London International Photographic Exhibition 1897, with premier distinction; was awarded the gold medal London 1900; and was an annual exhibitor at the "Salon." Mr. Coop started with a small studio in Potchefstroom, which was officially opened, with an exhibition of work, by the Mayor, on May 4th, 1904; he afterwards added various improvements, and in addition to the studio has now a fine double-fronted shop in which is displayed photographs of all kinds, as well as framing material, the latter being another branch of his business. The establishment is in the main street of the town.

BUSINESS PREMISES OF GARLICK & CO., POTCHEFSTROOM.

Business Premises of Jooste & Bryant & Stowe, Potchefstroom.

GARLICK & COMPANY.

The business firms of Potchefstroom are, to speak generally, unlike those of most towns, in so far as, in most instances, they may be stated to devote their attention to special trades, and there are very few that come under the description of "gene-

ral providers." Amongst the latter, however, may be mentioned Messrs. Garlick & Co., who established their local branch in 1888. The premises are situated at the north end of King Edward-street. The store covers an area of one full erf. The stocks carried are very extensive. The business is sufficiently large for its operations to be devoted to several departments, which consist, *inter alia*, of the following: drapery, clothing, millinery, boot and shoe, ironmongery, furniture, grocery, etc. Partitioned off from the main building, with its own frontage to the main street, is a wine and spirit department, and here, as elsewhere, the selection of the stock is extremely comprehensive, embodying a large variety of the various brands. It is under the joint management of Mr. David Jones and Mr. Herbert Elsey, both of which gentlemen came from the headquarters of the firm in Capetown, and fully enjoy the confidence of the house. To give some general idea of the local operations it may be stated that the stocks kept average in value from £20,000 to £25,000. A look through the establishment impresses the visitor with the neat way in which the goods are stored, and their fresh appearance. A matter worthy of mention is that a cottage is provided for the sleeping accommodation of the employees, and here the rooms are furnished with every comfort. The stabling attached to the premises also shows that the care of the animals used in the delivery vans is by no means overlooked. At the extreme rear are the rough goods sheds, where timber, paints, oils, and other materials, are neatly stored in large quantities. Messrs. Garlick & Co.'s Potchefstroom establishment takes precedence in the town as the largest commercial house.

Messrs. JOOSTE & BRYANT & STOWE.

The Potchefstroom branch business of Messrs. Jooste & Bryant, an influential Rand house of wine and spirit merchants, was established in 1903, in premises situated in King Edward-street. Mr. S. F. Stowe joined the firm as partner in the local business in August, 1904. Messrs. Jooste & Bryant & Stowe are agents for Sedgwick's celebrated Cape wines, Pasquali cigarettes, A. Sechoff's Magaliesberg tobaccos, and do a large country business generally. Messrs. Jooste & Bryant & Stowe's price list shows a most comprehensive selection, including the best obtainable brands of Cape wines, brandies, and liqueurs, in addition to imported wines and spirits, ales and stouts of premier class and wide range. Cigars and cigarettes form a speciality of numerous well-known labels and proved quality. The firm

Offices of the Potchefstroom Board of Executors and Trust Company, Ltd.

has the sole agency for half a dozen celebrated British distilleries, as well as for several continental wine merchants, and Edwards & Co., Jamaica. In the Potchefstroom establishment a large space is devoted to the bottling branch, necessary by reason of the extensive importations in bulk. The premier position which these well-known merchants have attained warrants the widely-increasing support which their skill and experience, combined with the excellent quality of their stocks, bring to them. Mr. Stowe is an enthusiastic Volunteer, being Captain and Quartermaster of the Western Rifles.

POTCHEFSTROOM BOARD OF EXECUTORS AND TRUST COMPANY, LTD.

Potchefstroom, like most important commercial centres, has its Trust Company. This, under the title of the Potchefstroom Board of Executors and Trust Company, Limited, was founded in 1875, and has had a very successful career. This is shown by the dividends which have been paid from time to time to its shareholders. During the 29 years of its existence it has paid out in dividends £29,100, and has a reserve fund of £7,500, while the Company's £10 shares were selling at the latter end of 1905 at £15. The premises are situated in the centre of King Edward-street, and embrace a fine suite of offices, part of which is occupied by Messrs. Koster & Co. and the Netherlands Bank of South Africa. From a revision of the balance-sheet for the year ended 31st December, 1904, and presented at the twenty-eighth annual general meeting of shareholders, the following figures are elicited:—Gross profits for the year on

THE QUEEN'S HOTEL, POTCHEFSTROOM.

a paid-up capital of £10,000 were £4,480 10s. 7d. The management expenses appear in comparison to be very moderate. This is doubtless due to a very large extent to the capable administration of Mr. M. A. Goetz, Chairman of the Company, and the assistance of the Directors of the Board, Messrs. Glen W. Seorgie, P. J. Peters, J. B. Retief, and J. A. Bonebakker, and the manager, Mr. M. W. Goetz. After the war, in June, 1902, the reserve funds of the Company stood at £1,800, and during the last three years has been increased to £7,500. Our illustration gives a general idea of the premises occupied by the Company.

THE QUEEN'S HOTEL.

This well-known first-class family and commercial hotel of Potchefstroom is the property of Mr. J. A. Hendricks, and was originally built about 1885. Mr. Hendricks has added an upper storey to the structure, and in other ways has considerably improved the property. The hotel is situated at the end of King Edward-street. The accommodation comprises 34 bedrooms, billiard-room, reception-rooms, and other conveniences. The house may be well recommended to visitors for its *cuisine* and moderate charges. The proprietor, who arrived in South Africa in 1875, is a Dane by birth. Prior to the war he conducted the Royal Hotel in Potchefstroom, as well as his present house. In 1902 he disposed of the former, and now devotes his attention solely to the Queen's Hotel.

THE ROYAL HOTEL.

The Royal Hotel, Potchefstroom, of which previous mention has been made, was rebuilt and opened in December, 1902. It possesses a fine frontage of 155 ft. to King Edward-street, and is a two-storey structure of some pretensions. There is a fine verandah on the first floor, from which many bedrooms and sitting-rooms open out. Several families among the Potchefstroom residents are permanently located in the hotel, and have private sitting-rooms in addition to their sleeping apartments. The large entrance hall forms also a lounge, and this leads through on to a pretty garden at the back, in the centre of which is an aviary. The establishment is distinctly English, the table being conspicuous in this respect. The banquet in honour of the first visit of Lord Selborne to Potchefstroom was held in the spacious dining-hall, which is capable of seating 150 persons. This is the recognised banquetting hall of the town. The Royal is also a commercial house, and is the headquarters of S. George's Association. A special word of praise is due to the attendance, and guests may rely upon being able to obtain the best of everything at a moderate cost. Mr. Joseph Patterson is the proprietor, but the business is under a capable manager, who may be justly congratulated on the admirable way in which the establishment is conducted. There are 50 bedrooms in this hotel. On the ground floor are five handsome shops, in addition to the hotel entrance, all of which are suitably tenanted. The management of the Royal Hotel are agents for the Mafeking mail coach.

PREMISES OF D. STOKES & CO., POTCHEFSTROOM.

D. STOKES & CO.

The firm of D. Stokes & Co., Potchefstroom (cycle depôt, and cycle material importers and repairers), was founded in 1902. Stocks of cycles and all accessories are kept on the premises, which are opposite the King's Hotel and Market Square, at the corner of Potgieter-street. The proprietors are Mr. D. Stokes and Mr. H. E. Kempster. Mr. Stokes, a native of the United States, has had travelled experience which places him as an authority not only in the cycle industry but also in connection with reforms needed in industrial departments in a new country like South Africa. He arrived in the Transvaal in 1899, remaining throughout the war, during the latter part of which he had a business in Johannesburg. Proceeding to Potchefstroom, Mr. Stokes commenced business in his present establishment shortly after peace was declared. His partner, Mr. Kempster, is a Natalian by birth, served an apprenticeship in mining engineering, and was resident in Johannesburg from 1887 until he joined Mr. Stokes in the Potchefstroom venture, entering into partnership with him in June, 1905. Mr. Kempster served for three years and nine months in the British lines as head conductor and superintendent of transport in the Western Transvaal district. He is the holder of two medals for services then rendered. Messrs. Stokes & Co. have attained a valued reputation for reliable repairs and general workmanship. Enamelling and brazing may be mentioned as special features of their work. Cycles are built to order by competent artisans. Several agencies are held, including those for dairy appliances, sewing machines, and cash registers. Erection and repairs of all classes of machinery are undertaken. The firm may also be applied to in emergency to replace lost safe keys, or to open safes under such conditions—a valuable adjunct to mechanical skill in authorised and special circumstances.

ROYAL HOTEL, POTCHEFSTROOM.

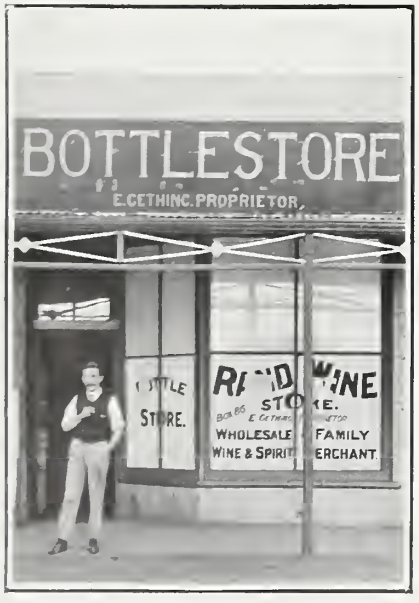
1.—The Quadrangle. 2.—Entrance Hall. 3.—Exterior View of Hotel. 4.—The Dining Room.

Randfontein.

The village of Randfontein is situated on a mining area, and is not a proclaimed township. Property-holders obtain their rights from the owners of the mining rights of this section of the reef; and, as these properties are of considerable importance, the settlement bids fair to become a centre of commercial prosperity. The houses and stores are principally in one main street, only one side of which is occupied with buildings. These are mostly retail business premises. Randfontein forms the westernmost extension of the Main Reef, is situated some 62 miles from Holfontein, the furthest point on the eastern extension of the reef, and some 25 miles distant from Johannesburg by rail. It is in the district of Krugersdorp, which prosperous town is the social and commercial centre for the West Rand as Boksburg is for the East Rand. The Randfontein Estates occur on a section of the reef which has a southerly bend, and dips to the east. Randfontein has a Government school. It possesses neither municipal rights nor independent local governing body.

MR. E. GETHING.

The Rand Wine Store is situated in the centre of Main-street, and is the only wholesale wine and bottle store in Randfontein. The firm do a very considerable trade, as they import and carry large stocks of every kind of foreign wines and spirits, besides dealing in the "Home-grown" or Colonial article. They also stock cigars and cigarettes, and have a flourishing branch of the business at Springs, where the same class of goods is dealt in. Mr. Gething was manager of a similar business in Roodepoort, before he started on his own account in Randfontein; therefore he is thoroughly versed in all branches of the trade. He is South African born, his birthplace being the lovely little town of Beaufort West in the Karroo; and he has lived in the Transvaal since 1896.



Premises of Mr. E. Gething, Randfontein.

INTERIOR OF THE RAND WINE STORE, RANDFONTEIN.

Roodegrond.

Roodegrond, situated some 30 miles north-west of Lichtenburg, is a farm belonging to the Coetzee estate. The store and hotel there are in the hands of Mr. E. Platnauer, a native of Bristol, England, who arrived in South Afriea in 1890, and after many interesting experiences in various parts of the country settled at Roodegrond in 1903. Mr. Platnauer's energy and foresight has done considerably to

MR. E. PLATNAUER'S RESIDENCE, "ROODEGROND."

MR. E. PLATNAUER'S STORE AND HOTEL.

advance the interests of this district. The farmers bring a great deal of their produce to him, and he creates to a great extent a local market for the district. The store is stocked with all the necessary goods for the requirements of the local settlers, and in addition cattle, mules, and sheep, as well as vehicles of all classes, are handled. This is the last store to be passed in Transvaal territory, travelling in the direction of Cape Colony West, being situated 200 yards only from the border. The business was established and the premises erected by the present proprietor in 1903, and include, in addition to the departments dealing with general merchandise, a butchery and an hotel. No licence was granted for this hotel for 1906, but the necessity for some accommodation on this road is very apparent to whoever uses it. Being the main coach road between Mafeking and Lichtenburg, it is much frequented. No doubt this matter will be rectified, and the licence which had been granted up to 1905 will be again renewed. Mr. Platnauer has erected a commodious and comfortable dwelling some distance from the store and hotel, which is surrounded by a fine and well-laid-out orchard.

Roodepoort.

Roodepoort is a prosperous and rapidly-increasing township on the West Rand, some 14 miles from Johannesburg. It is within easy distance of Krugersdorp, and is situated close to the railway line, although not actually on it. Since the war the township has made fast strides; schools, churches, dwellings, and business premises have sprung up with mushroom growth, and Roodepoort is rapidly becoming an important centre of industry. Although declared a municipality in 1903, Roodepoort did not obtain full municipal rights until 1905. The municipal area includes various other villages and small towns, these being Maraisburg, Florida, Hamburg, and Greymont. There are no town lands, nor any endowment from which municipal revenue is drawn; the Council, therefore, is at a great disadvantage, and funds for expenditure on the upkeep of roads, town lighting, etc., are sorely lacking. Property in the neighbourhood is difficult to acquire, owing to the adjoining lands being principally proclaimed mining area, held under claim licence. The water supply is to be provided by the Rand Water Board, no supply other than from wells sunk on private property having hitherto been available. The farms on which the municipal area of Roodepoort-Maraisburg are situated include portions of Paardekraal, Roodepoort, Weltevreden, Witpoortje, Waterval, Wilgespruit, and Vogelstruisfontein. In this district the first discoveries of gold in payable quantities in the quartz was made by the indomitable brothers Struben, whose five-stamp battery on the "Confidence" reef was erected in December, 1885. The banket formation, on Vogelstruisfontein, in 1886, and the great gold-bearing Main Reef, were discoveries also reported and established through the agency of the Messrs. Struben and their employés, the original pioneers of the Rand. Doornkop, the scene of Dr. Jameson's surrender, and of a subsequent spirited encounter in the war of 1899-1902, in which the Gordon Highlanders played a conspicuously gallant part, is in the near vicinity of Roodepoort.

Rustenburg.

The town of Rustenburg, the principal centre and only township of any importance in the Rustenburg district—which lies on the west of the Transvaal Colony—is situated some 63 miles from Pretoria. It is distant about 54 miles from Krugersdorp, with which town it is to be connected by rail. Rustenburg contains some 650 inhabitants, and the population of the entire district numbers 20,000 Europeans and 40,000 natives. This is one of the largest districts in the Transvaal, but is sparsely settled with centres of industry, and poorly provided with transport facilities. The magisterial centre, Rustenburg, was in former days a meeting-place of the Republican Government, and the Volksraad held sittings there before the seat of administration was fixed at Potchefstroom. Many of the old-time settlers' dwellings still stand, and give a picturesque touch to the appearance of the town. The thatched roof and mud floor, seen here, are fast disappearing from the Transvaal, and the primitive dwelling is being everywhere superseded by the corrugated iron or stone structures. The town today is of fair dimensions, containing several large stores, two hotels (the most important of which is described elsewhere), several churches, Government buildings, and numerous small shops in which various trades are carried on. There is a Municipal Council which cares for the interests of the town's affairs. An old tree still stands in one of the streets of Rustenburg, beneath which services were held before the erection of churches was completed. The district was the home of the Kruger family. The climate of Rustenburg district is sub-tropical, and but for the lack of water would be most fertile for cultivation. Some of the finest oranges produced in the Transvaal are grown in the neighbourhood of Rustenburg. The tobacco for which this district is famous has a great future as an article of commercial

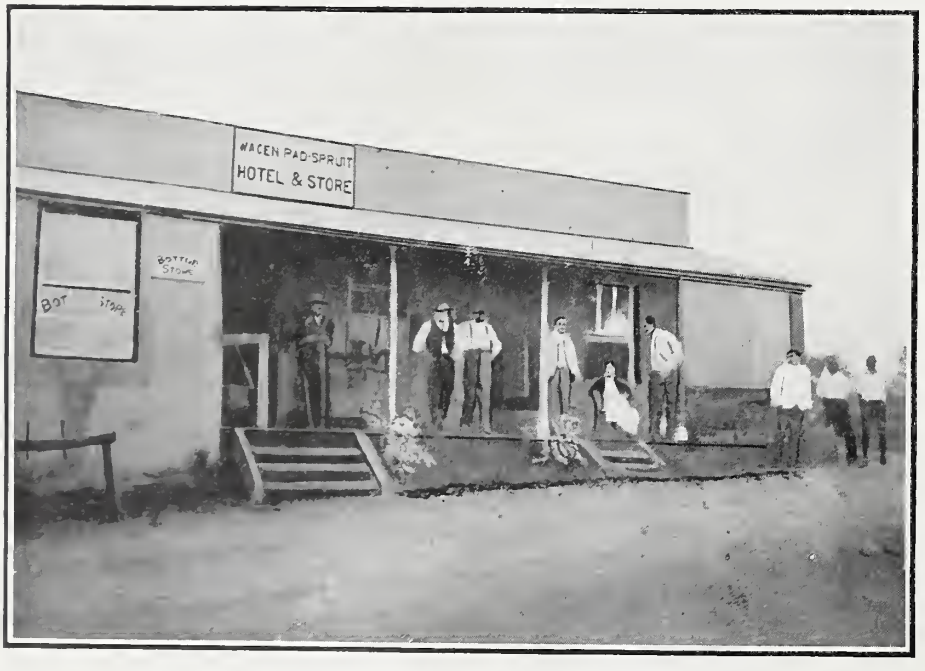
value. The Magaliesberg Range, running through the district, embraces many of the finest farms upon which tobacco crops are raised. "Magaliesberg tobacco" is known throughout the length and breadth of the sub-continent.

MESSRS. FUSSLEIN & VICKERS.

The cultivation of tobacco proceeds apace in many districts of the Transvaal suited to sub-tropical produce. The best-known growths are those from that part of the country crossed by the Magaliesberg Mountain Range, and the best tobacco produced and obtainable in the Transvaal is known as "Magaliesberg tobacco." The scenery of the Magaliesberg Range is well known for its beauty, and centres of industry in the surrounding districts should prove attractive for many reasons other than their utilitarian possibilities. At Wagenpadspruit, in the heart of the tobacco-producing country, the firm of Messrs. Fusslein & Vickers have established premises which comprise a large store, a hotel, and a steam corn mill (the latter in course of construction at the time of writing). The hotel is comfortable and airy, with good bedroom accommodation, and *cuisine* exceptionally good for a small country place. The steam mill will prove a great boon to the district, and furnishes proof of the enterprise and far-sightedness of the proprietary. The principal business, however, to which Messrs. Fusslein & Vickers devote their attention is the tobacco industry, and large quantities of this commodity, the product of the immediate neighbourhood, pass through their hands. The tobacco is placed on the market under the firm's brand "Southern Cross"—which is becoming extremely well known throughout South Africa. A considerable amount of new plant has been imported for the development of this branch of the business operations. Mr. Harold Vickers, of the firm under notice, is a native of London, and took up his residence in the Transvaal in 1901. His name is well known in Johannesburg in connection with several popular and successful business concerns. The neighbourhood of Wagenpadspruit is picturesque in the extreme, and it may be confidently expected that this little spot will become a favourite pleasure resort. The river runs within a few yards of the hotel, and, as fair-sized fish are

RUSTENBURG.

1.—PLEIN-STREET. 2.—THE DOPPER CHURCH (SHOWING "NACHTMAAL" CAMP). 3.—VIEW OF RUSTENBURG.



FUSSLEIN & VICKERS'S STORE AND HOTEL.

plentiful, good scope is offered for the devotees of rod and reel. There is excellent shooting also, both feather and buck, within easy reach of the Wagenpadspruit Hotel.

K. MACHOL & CO.

The above-named firm are proprietors of an important tobacco industry, situated on the southern slopes of the Magaliesberg Range, at Commissie Drift. This was established in 1891, for the purpose of working and manufacturing the local tobaccos, and distributing them throughout South Africa, in addition to which Messrs. Machol & Co. export to both London and Berlin. The plant used is Legg's patent, and is quite up-to-date. It is capable of an output of 10,000 lbs. per day. In the factory the tobacco is put up in three strengths—strong, medium, and mild—and it is packed in ¼ lb., ½ lb., and 1 lb. bags suitable to the requirements of the market. The tobacco from this factory enjoys an excellent reputation, and the trade done is of sufficient importance to necessitate the services of a representative who travels throughout South Africa on their behalf. A retail store is attached to the business, carrying a stock valued at £7,000. The entire premises are built over an area of 1½ acres, and comprise store, warehouses, tobacco factory, and dwellings. The partners in the firm are Messrs. Kurt Machol and Aaron Reiss, both natives of Germany, who have been resident in the district for many years.

Messrs. JOHN SOMERS & CO.

The business of Messrs. John Somers & Co., Rustenburg, was founded in 1883. In the early days the district was mainly devoted to cattle-raising, and the firm handled most of the stock, with which they supplied the Pretoria and Kimberley markets. The original business has considerably extended, and the small premises which were then suitable have been greatly added to. They are the property of the firm, are situated in Plein-street, and cover a considerable area, the frontage being some 200 ft. in extent. In 1904 a new frontage, including large plate glass windows, was added, this making the premises the most imposing in Rustenburg. The main building is laid out in show-rooms, in which the merchandise is admirably displayed. It embodies every conceivable requirement of the district, including agricultural and farming implements. Adjoining the store is a timber yard, in which large quantities of timber and other building materials are warehoused. The firm still continues to handle largely the produce of the district, which include the citrous growths, wheat, oats, and tobacco. There can be no question as to the fertility of the soil, and the district's prosperity must be largely identified with the firm under notice. Mr. John Somers, the resident partner, is a native of Graaff-Reinet, Cape Colony, and originally joined the firm of Messrs. T. W. Beckett & Co. in 1876. He opened the above business in 1883, and has conducted it ever since. Mr. Somers, who is a J.P., was the first Chairman of the Rustenburg Municipal Council, and is a member of the Licensing Board of the district. A branch business exists at Moedwil, some 16 miles from Rustenburg.

MESSRS. K. MACHOL & CO.

1.—Store. 2.—Warehouse. 3.—Tobacco Factory. 4. Another view of Factory.

PREMISES OF J. SOMERS & CO., RUSTENBURG.

THE TRANSVAAL HOTEL, RUSTENBURG.

THE TRANSVAAL HOTEL.

The Transvaal Hotel, Rustenburg, a remarkably well-built structure of two storeys, of solid stone, was erected in 1903. It is an exceptionally well-conducted hostelry, and it is a great boon to the travelling public to find such an extremely comfortable house in a country town. The proprietor, Mr. Arthur Barker, is a native of London, England, and arrived in South Africa in 1904. He is a man of considerable experience in his business, having been practically all over the world, and he thoroughly understands the art of making his guests comfortable. Attached to the hotel are billiard and sitting rooms, and spacious stabling. The bedrooms are very light and airy. The whole building is well fitted with modern improvements.

Springs.

Springs, which was constituted a Municipality by the Amending Ordinance of the 17th August, 1904, is situated to the east of Johannesburg, from which centre it is distant about 31 miles. From Springs a new railway route to Delagoa Bay is being pushed forward, traffic having already been opened in December, 1905, some distance beyond the township of Bethal. The railway will run through Ermelo. A small portion of the farm "Springs" (the property of the Government), from which the place takes its name, was laid out in December, 1904, and sold as a township. There was keen competition for the lots, and all were disposed of, the highest amount realised being £600 for one erf. The municipal area of Springs is 17,945 acres. This covers two townships—Springs and Geduld Deep. In addition there is the Great Eastern portion adjacent to the mine of that name. The buildings on the latter were erected on ground granted by the Grootvlei syndicate on monthly tenancy. Prior to the sale of Springs township lots no freehold building land was available. Since the sale buildings have rapidly been erected, and if the present rate of progress continues, another year should see the whole area built upon. The Geduld Deep township, which was sold in lots in January, 1905, adjoins that of Springs. In November, 1905, the assessment value of Springs was £157,578, but this is much under the actual value, as, no rate having thus far been levied since the formation of the municipality, there are many properties not included in the valuation roll. The public buildings in Springs include a post office, large Government school, municipal offices, a Masonic Hall, extensive police barracks, public library, and an Anglican and a Presbyterian Church. Plans had been passed at the end of 1905 for a Dutch Reformed Church, as well as edifices for other denominations which were also contemplating the erection of places of worship on stands granted by the Government for the purpose. The industries of Springs district are mining and agriculture. At the time of writing there were four coal mines working, with an aggregate daily output of 2,500 tons. A notable feature is that from the boreholes sunk in the neighbourhood gold has been proved to exist in payable quantities below the coal formation, so that while at present Springs may be termed a coal-mining centre pure and simple, it

SPRINGS MUNICIPAL COUNCIL.

will probably ultimately become a payable goldfield. The proclamation of the district as such has, in fact, been arranged. The surrounding country is devoted to farming on an extensive scale. Mealies, oathay, kafircorn, and potatoes are cultivated in considerable quantities. Large numbers of sheep and cattle are reared on the luxuriant pasture lands. The mines operating in the district are :—

contemplation a water scheme for the townships. The population of Springs when the census was taken in 1904 was given as 1,500 whites and 5,000 coloured persons. Geduld farm, on which the Geduld Deep property is situated, was originally owned by Mr. Paul Kruger, President of the former Republic, and was disposed of for a large sum to Messrs. Goertz & Co. The Company will employ

December, 1905. He is a native of Lanarkshire, Scotland. Mr. Addie is by profession a mining engineer. Arriving in South Africa in 1894, the first 4½ years of his residence in the country were spent in the capacity of manager at the Cornelia Mine, Orange River Colony, the property of Messrs. Lewis & Marks. Mr. Addie took over the management of the De Rietfontein Colliery, for

BUSINESS PREMISES OF KIRSCH & CO., SPRINGS.

The Geduld Proprietary Mines, Ltd., on which property six shafts are being sunk near the town ; the Cloverfield Mine adjoining, where shaft-sinking is also proceeding ; the Lace Proprietary Mines, the East Rand Mining Estates, Ltd., the Grootvlei Syndicate, the Welgedacht, and others. At Welgedacht there is a combined gold and coal proposition. On all the above-mentioned boring operations have given promise of good results. Springs municipal authority has in some 500 whites when fully equipped, in addition to considerable numbers on the subsidiary companies. This large addition to the population of the district should help to substantially increase the importance of Springs as a growing industrial centre.

Mr. JOHN KENNETH ADDIE, J.P.

Mr. J. K. Addie was Chairman of the Springs Municipal Council in

the Transvaal Coal Trust, Ltd., in February, 1902.

Mr. JOHN H. ALEXANDER.

The subject of these notes was born in London, and resided as a boy for some years in Manchester. He arrived in South Africa in 1888. Mr. Alexander first started business on the Reef as a general storekeeper, and then built the Unified Hotel at Maraisburg. In 1896

he proceeded to Springs, establishing there as a baker, butcher, and produce merchant. The butchery department Mr. Alexander afterwards abandoned.

E.C., of which he occupied the chair four times. He now holds a high office of the District Grand Lodge, Transvaal. Mr. Alexander is President of the

and was purchased by Mr. Joseph Kirsch in June, 1905. It is the largest establishment of its kind at Springs. The premises are situated in the second

SPRINGS HOTEL.

The premises of the present business are situated in the main street of the "old town," where the proprietor is conducting a large concern. Mr. Alexander was appointed President of the East Rand Vigilants, Springs branch, which agitated for a municipality, courthouse, post office, etc. He was elected to the Springs Urban Board, and was re-elected to the first Municipal Council, in which he topped the poll by a large majority. He is Chairman of the Finance and General Purposes Committees of the Council, and is also the Springs representative on the Rand Water Board. Mr. Alexander is a prominent Freemason, and was a founder of the Coalfields Lodge,

Springs Football and Cricket Clubs. During the war he was senior leader of the Imperial Hospital Corps for a year and eight months, and was in charge of irregular orderlies attached to the R.A.M.C., at the 7th General Hospital, Esteourt, and the 13th General Hospital, Newcastle (Natal). He was nine months with Captain Macdonald, O.C., Supplies, A.S.C. depôt, Elandsfontein, fulfilling a responsible office.

Messrs. KIRSCH & CO.

The general business of Messrs. Kirsch & Co., Springs, was first established by Mr. J. M. Goodman in 1901,

avenue facing the proclaimed Market Square, and adjoining the new double-storey hotel recently erected. Messrs. Kirsch & Co. are direct importers of general merchandise, and also produce dealers. Mr. Kirsch arrived in South Africa in 1894, establishing first at Durban, where he still carries on his business in premises in Central West-street. He was elected to the Municipal Council of Springs in 1905.

Messrs. MALCOLM SMITH & CO.

At the beginning of 1905 Mr. M. Smith, who is a native of Helensburgh, Scotland, opened up a timber and iron

PANORAMIC VIEW OF STANDERTON FROM THE EAST.

merchant's business in the township of Springs. Here he has erected suitable premises, and now has a fairly extensive yard in which large stocks of timber needed in the requirements of the district trade are stored. In addition Mr. Smith stocks window-frames, doors, and such-like material used in building. Arriving in South Africa in 1894, he stayed for a time in Johannesburg, and afterwards proceeded to Rhodesia, where he started business. Like many others, Mr. Smith was attracted by the prospects of the Rand, and he disposed of his interests in Rhodesia to return to this portion of South Africa, opening his present business at Springs. The results he has so far found satisfactory. Mr. Smith was elected to the Springs Municipal Council in 1905.

Malcolm Smith & Co.'s Business Premises, Springs.

SPRINGS HOTEL.

The Springs Hotel, owned and conducted by Mr. I. M. Goodman, is a fine two-storey structure, situated in the centre of the township. It has been recently re-built, and is now a fully up-to-date establishment containing the latest improvements. There are 32 bedrooms in the hotel, furnished with modern conveniences: bath-rooms, with hot and cold and shower baths; a fine dining-room, and well-appointed sitting-rooms. The hotel is conveniently placed, being opposite the railway station and close to the municipal offices, banks, and post office. It is within easy distance of the following mines:—Geduld, Cloverfield, Welgedacht, Rand Klipfontein, Daggafontein, Geduld Deep, Rietfontein, East Rand Mining Estates, Great Eastern Collieries, Clydesdale Colliery, Tyne Valley Colliery, Geygerle, Lace Proprietary Mines, and others. The *cuisine* at the Springs Hotel is good, and careful attention is paid to the selection of spirits, wines, and cigars stocked. The stabling is commodious. Mr. Goodman is a personality in the district, and may be relied upon to do his best in creating a favourable impression of Springs in the minds of all his visitors.

MEMBERS OF THE MUNICIPAL COUNCIL, STANDERTON, 1905.

Standerton.

Standerton town and district, in the Eastern Province of the Transvaal, derives its name from Adrian Henrik Stander, the one-time owner of the farm "Groot Verlang," on which the town of Standerton is situated. He was born in George, Cape Colony, and trekked into the Transvaal from the Orange Free State with his family in 1864, suffering great hardships through native risings. Mr. Stander took a prominent part in the battle of Boomplaats. He purchased the whole farm of "Groot Verlang" from the Government for the sum of £22 10s., and in 1870 sold it, together with his homestead (situated under Standerton Kop), for about £3,000, the purchasers being

a syndicate who bought the land for the purpose of forming the township of Standerton. At that time this portion of the country presented a severely barren aspect, with neither bushes or trees: but it was overrun with immense hordes of wild animals and droves of game, consisting principally of lions, jackals, leopards, wild dogs, eland, blue wildebeest, black wildebeest, blesbok, hartebeest, springbok, quagga, rhebok, oribi, wild ostrich, and many kinds of large and small fowl. An eye-witness, John Henrik Stander (second son of Adrian), at present residing in Standerton, describes the scene as follows: —"The earth seemed to bend as the troops upon troops of game passed by, and a rider had to be very careful or he would be trodden to death; in fact, they were more like locusts than wild game." The district of Standerton is about 748,000 morgen in extent, and is bounded on the north by Middelburg, east by Ermelo and Wakkerstroom, west by Heidelberg, and south by the Vaal River and Natal. It is watered by the Vaal River, Blesbokspruit, Waterval, Boesman's Spruit, and the Klip River. It is a first-class agricultural district, and for successful farming in stock is excellent. The rinderpest and the war each in turn were responsible for great havoc amongst cattle, horses, and sheep, yet—with the non-prevalence of the stock diseases common in so many parts of South Africa—the district is rapidly recuperating. The Standerton district possesses two magistracies, one in the town of Standerton, and one in the town of Bethal. The population of the district is approximately 12,000 whites and 15,550 blacks. The total revenue from July 1st, 1902, to January 1st, 1906, amounted to £55,823 12s. 4d. The industries of Standerton district are agriculture and stock-farming. The principal institutions are the Government Stud Farm at Vlakfontein, under the management of Capt. Blackburn, and the private Stud Farm at Kromdraai, owned by the Hon. Hugh Wyndham. The soil of the district is good, principally loam and sand, in some parts showing the latter to the depth of five feet—a perfect soil in all parts of the district for cereals, given a fair rainfall. The mineralogical indications are favourable, although up to the time of writing the only payable proposition was a seam of anthracite coal being worked at Steenkoolspruit, near the town of Bethal. Good samples of gold banket, similar in appearance to the Witwatersrand Main Reef, have been found from time to time, but the best have only assayed about twelve grains of gold to the ton, and no sound reef has been located, only small patches of a conglomerate float. That diamonds will be found in the near future is probable, for the prospecting that has been carried out in several parts of the district has revealed a peculiar rock of unequivocal volcanic origin, very similar in appearance to that found in Griqualand West. Standerton, the principal town in the district, and the capital of the Eastern Transvaal, has an area of about 3,000 morgen. Its altitude is 5,025 ft. above sea level. It has a population of about 6,000, of all nationalities. Under the provisions of Ordinance 58 of 1903 the former Health Board was abolished and the Municipality of Standerton was established. For municipal purposes the town is divided into four wards, north-east, north-west, south-east, and south-west, each being represented by three Councillors. The Council consists of twelve members, who annually elect a mayor from their ranks. The rateable value of property is £560,381. The revenue returns for 1905 gave the total as £9,915, with expenditure for the same year £8,143. The principal liability consists of £25,000, representing a loan raised for the construction of the town

RAILWAY STATION PREMISES, STANDERTON.

BURGHER-STREET, STANDERTON.

waterworks, which were completed in October, 1905. The number of natives registered during 1905 was 1,300. A Chamber of Commeree was established in 1902, which took a leading part in dealing with several important matters agitating the public mind at the conclusion of the war. The local churches are well supported, and represent many denominations, including Church of England, Dutch Reformed, Herformde, Dopper, Presbyterian, Wesleyan, Hebrew, and Native Church. There is a branch of the Society of Freemasons, three branches of the Independent Order of Good Templars, one of the Ancient Order of Buffaloes, and of the Flower of Zion. There is a Government school, a Dutch Reformed school, and an independent school called St. Andrew's. The principal buildings are the Government schools and the Masonic Temple. On the outskirts of the town are the military cantonments, but the headquarters of the Eastern Rifle Volunteers are in the heart of the township, and in the same building is the home of the weekly publication, the *Eastern Transvaal Times*. With its bracing climate, its fertile soil, and its freedom from stock pests, etc., the Standerton district is an alluring spot for the settler, and should speedily become prosperous.

THE FIRM OF JOHN GIBSON.

The late Mr. John Gibson, of Standerton, who was the proprietor of the first general merchant's store in that town, established the business bearing his name in 1871, when there were only a few houses erected besides the homestead of Mr. A. Stander, the founder of the town, and after whom it is named. The business premises of this house are situated in the centre of the town at the corner of Burgher-street and Market Square, and cover a large space, extending through to the next street. The store is known throughout the entire district, and bears a high reputation not only for the stocks carried, which are of a first-class quality, but for the reasonable prices at which the articles are sold. With regard to the general goods: these include hardware, agricultural

THE FREEMASONS' HALL, STANDERTON.

The late Mr. John Gibson, of Standerton.

DUTCH REFORMED CHURCH, STANDERTON.

machinery, building materials, and groceries, in addition to which a special feature is made of dress materials and hats of the very latest style.

THE DOPPER CHURCH AT STANDERTON.

which are imported direct from the best European firms. After a casual glance at the stocks in these departments, one cannot fail to pass a high compliment to the buyer for the tasteful selection of the goods displayed, which are really worthy of the inspection of intending purchasers. The products of the district chiefly consist of wool, hides, and farm produce, and in these also the firm does a considerable business.

A retrospect of the late Mr. Gibson's connection with the Transvaal is of interest. Hailing from Glasgow, he arrived in Natal in 1850, when he started as an agriculturist and stock-raiser at Glenlynden. For twenty-five years he continued this occupation with marked success, eventually earning for himself the reputation of being the largest stock-breeder in Natal. In the early days, at the request of some friends, he fully equipped several wagons and sent them into the interior. This led to the establishment of a large trading business, which flourished for many years. In 1869, with Mr. David Fraser, who is well known in Pretoria, Mr. Gibson entered into a scheme of opening stores in the Transvaal and the Orange Free State. Their first venture was in the Wakkerstroom district, at the cross roads at Stryd-kraal, and subsequently branches were started at Vrede, Harrismith, Sand Spruit, and Middelburg, Transvaal. When the goldfields first opened, Mr. Gibson invested largely in shares, and with the slump of 1889 lost heavily. He went to live in Standerton in 1890, and here, as elsewhere, he was held in the highest respect by all who knew him.

LANDAU & CO.

Situated in premises on one of the most valuable blocks in Standerton, opposite the Post Office, the firm of Landau & Co., general merchants, has a splendid reputation, and is one of the best-known businesses in the district. Established 13 years ago by Mr. Charles Landau, the present managing partner, this concern has been worked up from that of a small country store to one of considerable importance. Customers can be supplied with almost every mentionable article for the household or farmstead. The firm imports direct the very latest designs in the furnishing lines, and their prices compare favourably with those of the large houses in Johannesburg and elsewhere, while in agricultural implements a large trade is carried on with the surrounding farmers. Subsequent to the 21st June, 1900, when General Sir Redvers Buller and his army corps took possession of the town from the Boers, Messrs. Landau & Co.'s business abilities were severely taxed. Much damage had been wrought, and many farmhouses had been devastated. It therefore fell to their lot to re-furnish many domiciles. An energetic man of business, Mr. Charles Landau has done much for the benefit of Standerton, where he takes considerable interest in public matters. At the time of writing he is Mayor, Chairman of the Chamber of Commerce, and President of the Building Society. He has the welfare of Standerton at heart, and does all in his power to further its interests.

ANGLICAN CHURCH, STANDERTON.

EXTERIOR OF J. GIBSON'S STORE, STANDERTON.

LANDAU & CO.'S STORE, STANDERTON.

1.—Drapery Department. 2.—Furniture Department. 3.—Hardware Department.

Ventersdorp.

Ventersdorp, situated 24 miles from Frederickstad, its nearest railway station, is on the Schoonsprnit River, and a few miles below its source. It is built on the farm from which it takes its name, originally owned by the Venter family. This was cut up into erven and sold as a township in 1866. As such it was proclaimed in 1884, and a few years later the Government laid out a large portion of the dry lands into burgher erven. The Schoonsprnit is a fine permanent stream passing through Klerksdorp and emptying into the Vaal River. The country through which it runs is an extremely fertile valley. Flowers, including roses, have been known to bloom for three-quarters of the entire year. The products of Ventersdorp and its district include, among other cereal growths, wheat, oats, and barley, which thrive luxuriantly. Quinces, figs, and walnuts form the hedges of many of the pretty local dwellings, and grow almost wild in the dorp. A large number of cattle are raised in the district. The formation of the country is dolomite, and it is claimed that the Hospital Hill shale and the black reef intersect the town commonage. There is granite formation two miles to the south-east of the village. Minerals known to exist in the district include lead, manganese, and copper, but whether these are in payable quantities has so far not been decided. At the last census the population of Ventersdorp was 480 whites and 368 natives. The commerce is represented by several important local firms. The district is a steady and prosperous one, and does not appear to be subject to the variations of climatic influences which affect some other portions of the Transvaal. There is one licensed hotel in the village, for the accommodation of the travelling public. Ventersdorp is a municipality, and appears to be well cared for by the controlling Council.

PREMISES OF A. CHEYNE, VENTERSDORP.

Mr. A. CHEYNE.

Mr. A. Cheyne is the proprietor of one of the prosperous mercantile houses in Ventersdorp. The business was originally the property of Messrs. Thos. Leask & Co., and was taken over by its present proprietor in 1888. The main premises of the firm are centrally situated, and comprise an extremely well-stocked store, containing a very varied assortment of merchandise, of which agricultural and farming implements, as well as building and mining materials, form an important part. A great deal of the produce of the district comprises grain, tobacco, and wool, and the farmers utilise this house as an outlet for their products. Notwithstanding the greater facilities which later years have given them, they still prefer to bring their crops to their old market, relying as they do upon the absolutely fair treatment accorded them. Mr. Cheyne comes from Aberdeen, Scotland, and arrived in South Africa in 1872. Since 1881 he has resided in Ventersdorp, where he is much respected.

Messrs. HOLMES & SON.

The business of Messrs. Holmes & Son in Ventersdorp was opened in 1903, and is connected with the old-established house of the same name trading at Upington, Cape Colony. The building in which the firm's business is carried on in Ventersdorp is spacious and most convenient. The stock is replete with all requirements for the local trade, and is well and carefully selected. The firm is doing a fair share of the business of the district, and handles wool, mohair, and other local products. Building materials in all branches and the importation of vehicles form an important part of the firm's general trade. The partners are Mr. J. Holmes, and his son, Mr. O. Holmes, the latter gentleman being the managing partner of the local business, whilst his father conducts the Upington store. Mr. Holmes, senior, who formerly resided at Ventersdorp, was one of the first members of the Urban Council, and was elected to the chair of the Municipal Council in the second year of its existence. The building in which the Ventersdorp business is contained was erected by the firm.

Holmes & Son's Store, Ventersdorp.

Mr. C. W. HUDSON.

Mr. C. W. Hudson, the present Chairman of the Municipal Council, who arrived in Ventersdorp in 1883, is a native of Cape Colony. He started business as trader in the district, settling in the township and building his first store in 1889. The present commodious premises were erected in 1905. They comprise large general store, dwelling-house, butcher's shop and bakery, as well as large yards for storing wool and grain and other products of the district handled by the firm. Mr. Hudson has also a store and hotel at Witport, some 12 miles east of Ventersdorp, on the main Potchefstroom and Frederiekstad roads. The firm's stock, which includes all requirements for a country trade, is bought in the best markets. Mr. Hudson imports direct, as well as doing a large business in the Colony with Messrs. J. W. Jagger & Co. A speciality is made of agricultural implements, Mr. Hudson

Mr. C. W. Hudson's Premises, Ventersdorp.

himself being a practical farmer. He was the first to introduce into the district the Robinson five-furrow spoulding disc plough, and his technical knowledge makes his opinion concerning the possibilities of the Ventersdorp district, as a grain-producing centre, worth recording. Mr. Hudson states unhesitatingly that in his opinion Ventersdorp district is the greatest grain-producing area in the Transvaal. He is personally largely interested in farming. He has always been a prominent townsman, and was amongst the first to be elected to the Council, being appointed to the chair in 1906. Mr. Hudson has been one of those selected to represent his fellow-townsmen on nearly all occasions where the Government has been approached by a deputation of the inhabitants of the district.

Vereeniging.

Vereeniging, a small township with a population of about 500 whites, stands on a site which is portion of a concession made in 1889 to the firm of Messrs. Lewis & Marks, under charter from the Government of the South African Republic. It is the border township immediately on the Vaal River after passing over the bridge from the Orange River Colony, and where Viljoen's Drift (or "ford") formerly gave the only crossing. Vereeniging has been the scene of some political events of importance to South Africa. Here it was that the meeting between Presidents Kruger and Reitz took place in connection with the "closer union" policy between the Transvaal and Free State Republics. From this the name Vereeniging ("Union") was given. In 1895 the closing of Viljoen's Drift and other Vaal River drifts against over-sea goods traffic brought about the "drifts question"—the subject of an ultimatum from the British Government. It was at Vereeniging where, at the close of the Anglo-Boer war in 1902, the terms of peace were concluded. The township, which was surveyed in 1892 by Mr. Jorissen, is laid out in rectangular plan. The first sale of erven took place in April of that year, since which period, up to the time of writing, very few have been sold, although it is understood to be the intention of the Company (Vereeniging Estates, Limited) to construct waterworks, after which more stands will be offered for sale. The Company has built a weir across the Vaal River, and the banks for a distance of some miles are being attractively laid out. It is at a point some 200 yards on the south side of the Vaal River bridge, the river here being 200 yards in width. The weir provides a boating reach from six to eight miles in length. On the river bank, on the Orange River Colony side of the Vaal, the Company has a plantation of 3,000,000 trees, principally of oak and pine. On the Vereeniging side, adjacent to the township, a large park is being laid out. The Government buildings consist of Court-house, public school, and post and telegraph offices. The township is a portion of the Heidelberg magisterial district, and has its own Assistant Resident Magistrate. The A.R.M. of Vereeniging has an area in Potchefstroom district over which he exercises civil and criminal jurisdiction, but has not administrative rights; so that at present, while the former is controlled by the Vereeniging official, the latter is under the Potchefstroom magistracy. Although up to the present scattered, and but a town in embryo, it is making steady but sure progress. There are a few nice dwellings, of which may be specially mentioned those occupied by the Magistrate, the Chairman of the Muni-

Court-house, Post and Telegraph Office, and Pass Office, Vereeniging.

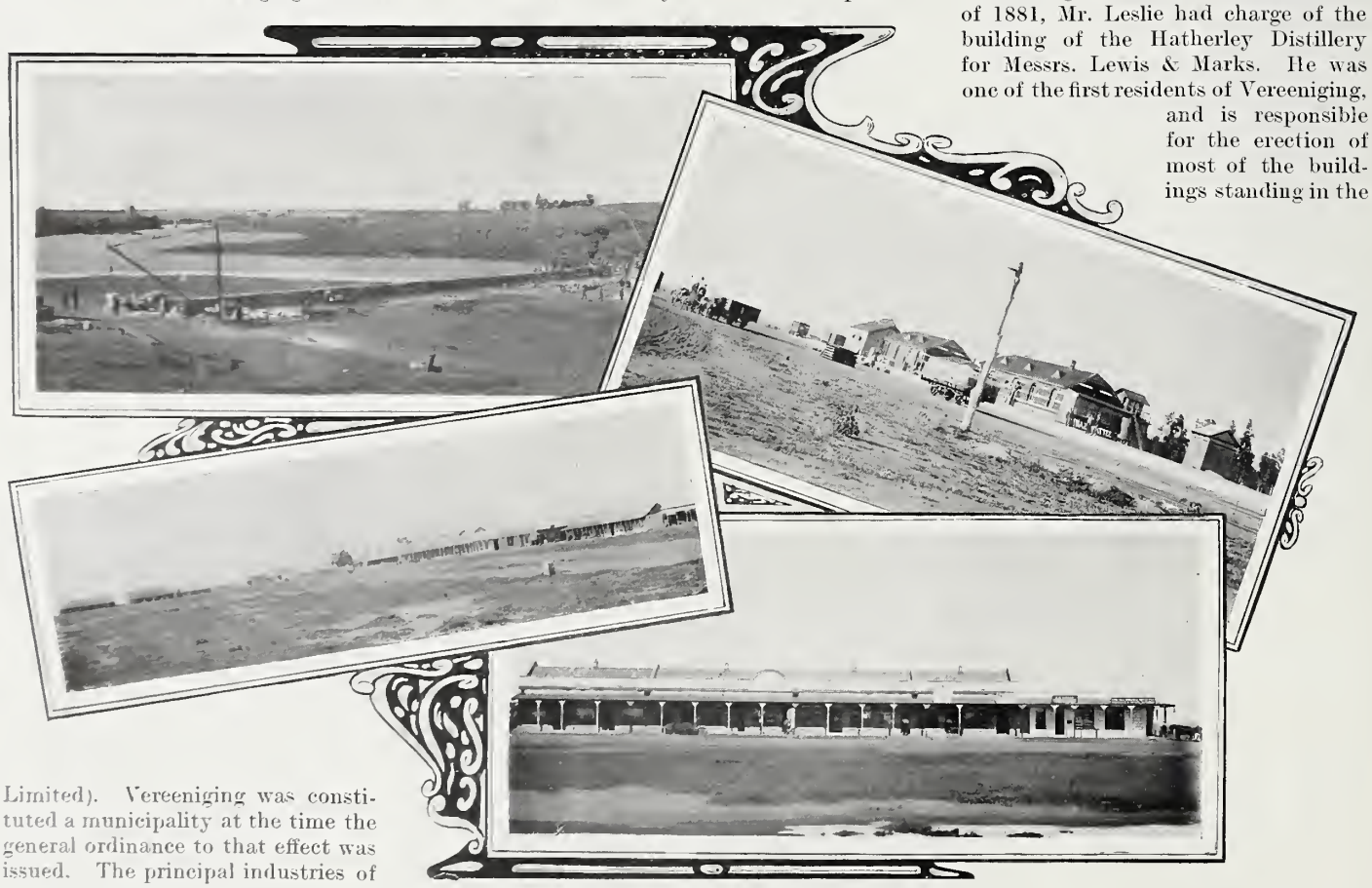
"OOM PAUL'S LAST TREK."

Funeral Train containing the remains of the late President crossing the Vaal River Bridge at Vereeniging into Transvaal Territory, *en route* to Pretoria.

cipal Council, and the manager of the Brick and Tile Company (an offshoot of the Vereeniging Estates, Limited). Vereeniging was constituted a municipality at the time the general ordinance to that effect was issued. The principal industries of the district are coal-mining—several mines being in active work in the immediate vicinity of the township—and brick and pottery works. It is interesting to note that in the Vaal River bed near Vereeniging a very large number of specimens of stone implements have been found. They are of varying sizes and shapes, and a very valuable collection of these ancient relics has been made by Mr. Leslie, of Vereeniging. The river affords splendid fishing. Altogether, when the scheme of development is completed, Vereeniging should become one of the popular pleasure resorts for Johannesburg residents. Golf links are to be laid out, a club-house erected, and boats of all descriptions available. The average depth of water will be about 5 ft. This will afford excellent bathing, as the river bottom consists of shingle. Arrangements are in contemplation with respect to hotel accommodation, the Company having in view the carrying out of these on a liberal scale.

MR. T. M. LESLIE.

The Chairman of the Vereeniging Municipal Council, Mr. T. M. Leslie, is a native of Nottingham, England, and arrived in South Africa in 1880. Proceeding to Pretoria at the latter end of 1881, Mr. Leslie had charge of the building of the Hatherley Distillery for Messrs. Lewis & Marks. He was one of the first residents of Vereeniging, and is responsible for the erection of most of the buildings standing in the



VEREENIGING.

1.—WEIR IN CONSTRUCTION ON THE VAAL.
2.—THE IMPORTANT RAILWAY STATION ON THE VAAL RIVER AND ORANGE COLONY BORDER.
3.—BUILDINGS IN THE RAILWAY SQUARE.
4.—THE UNITED BUILDINGS.

township, including the Government buildings and those of the Company. Mr. Leslie has been connected with scientific societies in South Africa for many years. He was elected F.G.S.

Specimens of Stone Implements discovered at Vereeniging by Mr. Leslie.

in 1900, and F.R.Met.S. in 1902. He has dealt specially with fossil flora, of which he has collected many beautiful and interesting specimens in the Vereeniging district. On this subject and research he may be considered to be a recognised authority.

Messrs. H. W. BASS & CO.

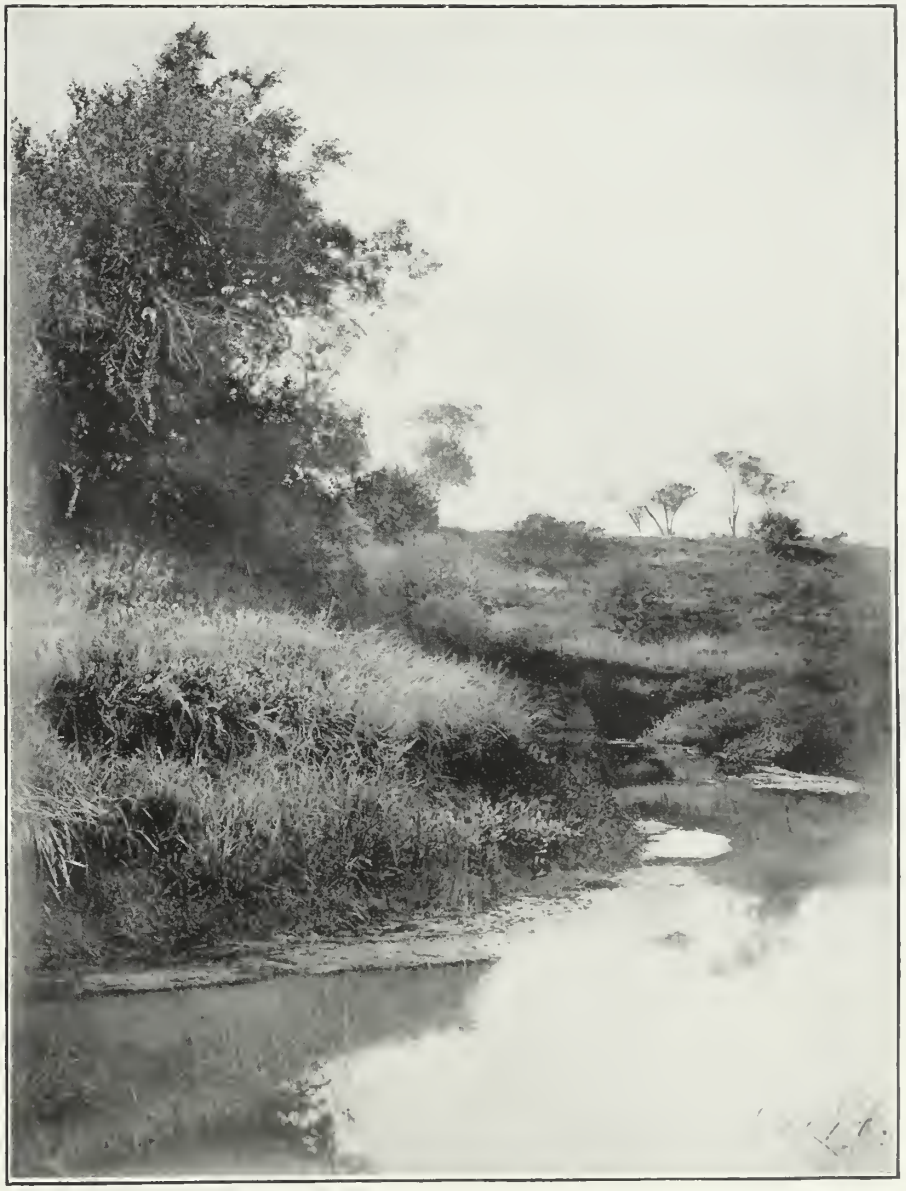
The general business of Messrs. H. W. Bass & Co., Vereeniging, was established about 1890, and brought under its present style in 1897. It is under the control of Mr. H. W. Bass, managing partner. The premises, which are the property of the firm, consist of a stone building occupying an area of about 200 ft. by 200 ft. facing the Market Square. This large store is stocked with all kinds of general merchandise, and it is encouraging to note that Messrs. Bass & Co. report that even during the bad times which were experienced throughout the country at the end of 1905 they were maintaining their usual average turnover. The firm handles a large quantity of mealies and kafircorn in addition to other produce grown in the district, Johannesburg being the market. Mr. H. W. Bass, who is a native of Ipswich, England, has been resident in the Transvaal since 1880. He arrived in Vereeniging in 1890, and was accountant with the firm prior to becoming a partner of the business. Mr. Bass was elected to the Municipal Council of Vereeniging in 1905.

Mr. MORRIS PATLANSKEY.

Mr. M. Patlanskey, general storekeeper of Vereeniging, one of the "city fathers" of this coming township, was among the earliest arrivals in Johannesburg, which he reached in 1886. Mr. Patlanskey claims to have been one of the first dozen pioneers of the Witwatersrand. He remained in Johannesburg for a period of 16 years, proceeding to Vereeniging after the British occupation of the Transvaal, where he commenced the business of a general store and bakery, to which he has since added an aerated water factory. The latter branch has met with great success. Mr. Patlanskey was one of the foundation members of the Municipal Council, and is Chairman of the Works Committee. In connection with the bakery business he supplies the whole district.

Mr. FREDERICK ROOTH.

Mr. F. Rooth, attorney, notary-public, conveyancer, and sworn translator, of Vereeniging, is a native of Cape Colony, and served his articles with his brother's firm, Messrs. Rooth & Wessels, Pretoria. He is the senior partner in the firm of Rooth & Savory, whose offices are situated at the corner of Fox-street and Rissik-street, Johannesburg. Mr. Rooth personally conducts the practice of his profession in Vereeniging, where he established himself in 1905. He is owner of portion of the farm Kaalfontein, in the district of Potchefstroom, situated about 14 miles from Vereeniging.



SCENE ON THE KLIP RIVER, ONE MILE FROM VEREENIGING.

H. W. BASS & CO.'S BUSINESS PREMISES AT VEREENIGING.

MR. MORRIS PATLANSKEY'S STORE, VEREENIGING.

Volksrust.

Volksrust, which is situated on the border overlooking Natal, in the mountainous and picturesque division of Wakkerstroom, was originally laid out as a township in 1888, the farms "Leanwarne" and "Sandfontein" being acquired and apportioned for that purpose by the Government of the South African Republic. The first public auction of erven took place on the 1st April, 1889, and a supplementary sale was held on the 18th of the same month. Before the construction of the railway connecting Charlestown (Natal) and Johannesburg, Volksrust was of little note other than a small country post town. With the advent of the railway it speedily took its true position as a border town, railway centre, customs port of entry, and as receiving and distributing depôt for the trade of the well-stocked farming district of the south-eastern Transvaal. For some years Volksrust had been the site of the wool-buying business of Mr. Simon Michaelson; upon the railway being opened other firms also made it their centre of business in dealing with the wool resources of the district. The erection of a Court-house, post and telegraph offices, public school, and other public buildings followed. A water supply was inaugurated by the Government, and laid on to the township from the farm Schuilhoek, some eight miles away, in 1898. The population within the municipal area on the 17th April, 1904, as shown by the Government census, was as follows:—Whites, 1,342; aborigines, 907; coloured people, 133; total, 2,382. The population for licensing purposes, computed at the sitting of the Licensing Court on December 13th, 1904, was estimated to be 600 males over the age of 16 years. The voters' roll compiled in July of the same year gave 462 registered voters; the valuation roll in 1905 totalled (including railway property) £193,963. Just prior to the outbreak of the war in 1899 the town had attained approximately a population of 1,000. During the war Mr. Verploegh represented the Republican Government as Special Landdrost of Volksrust, and retained that position until the occupation of the town in June, 1900, by the Imperial forces under General Buller. The town was garrisoned continuously during the remainder of the progress of hostilities. On this account it probably suffered less and recovered more quickly from the actual effects of the war than any other country town in the Colony. Since the war it has progressed in a marked degree. Business premises, with modern show fronts, and villa residences of superior class, have superseded the old wood-and-iron shanties which did duty in the earlier days. A commencement was made with roads and other public works, hitherto almost entirely neglected in the first 12 or 14 years of the town's existence (it was only during military occupation that a sanitary service was initiated). In December, 1901, a Health Board was gazetted; the first Urban District Board was constituted in December 1903; and in August, 1904, the Urban Board became a Municipal Council by virtue of Government Ordinance of that year.

MEMBERS OF THE VOLKSRUST TOWN COUNCIL, 1905.

COURT-HOUSE, VOLKSRUST.

VOLKSRUST.

1.—Joubert-street. 2.—Langes Nek-street, facing north. 3.—Slang River Falls.
4.—View of Volksrust, looking south; Majuba on the left.

One of the first municipal undertakings of importance was the erection of town offices, which were built on the Market Square, and were formally opened by the Lieut.-Governor, Sir Arthur Lawley, on May 20th, 1904. These were the first municipal buildings erected in any town in the Colony outside Johannesburg. Sites have been reserved on the remaining half of the Market Square for a Town Hall, and also for Government Buildings. Additional town erven in the vicinity of the railway station have been laid out, to be disposed of at auction as soon as Government sanction is obtained and other formalities observed. A bi-weekly morning market was established, registration of male natives in the municipal area initiated, and necessary bye-laws compiled and revised. Volksrust possesses a valuable municipal asset in its town lands, which in extent are approximately 2,945 morgen. They embrace sites of marked beauty of situation, which in the future will doubtless be taken advantage of in the development of suburban townships with plots for residences of superior description, in addition to larger reserves for agricultural purposes. The Municipal authorities have recognised the necessity for increasing the town's water supply, and in 1904 the heightening of the dam wall at Schuilhoek had been successfully completed, the result being to secure a water supply sufficient for the requirements of the town for several years. As a commercial centre the position of this town may be described as a particularly favoured one. The Municipal Council appears to be diligently bent upon developing the natural resources of the town, which its "city fathers" are sufficiently ambitious to hope will speedily take its place as the "leading town in the leading district south of Johannesburg." Among other schemes of municipal importance which were under consideration by the Council as pressing duties at the end of 1904 may be mentioned a system of electric lighting, distribution of the water supply, erection of fire hydrants, planting of trees within the municipality, the laying out of a public park, and the fencing in of town lands. Volksrust is distant 175 miles from Johannesburg. Its altitude is upwards of 5,400 ft. above sea-level. The scenery is bold and picturesque. Some eight miles from the township are to be found the falls of Slang River, a favourite resort. Diamonds have been discovered, some 30 miles distant, on Esser's farm. Majuba Hill, famed in connection with the first Anglo-Boer war, is about an hour and a half's drive from the town. Coaches and post carts leave Volksrust for Amersfoort, Ermelo, Lake Chrissie, Carolina, and Machadodorp. The railway station is one of the finest in the Transvaal, the construction being of sandstone supplied from quarries adjoining the town lands. The station cost the late Government £15,000. The *Recorder*, a weekly paper on Progressive lines, is published every Saturday.

Mr. S. BROMLEY KEMP.

The present chairman of the Municipal Council of Volksrust, Mr. S. Bromley Kemp, is a man of varied experience. The junior member of an old English family, he arrived in South Africa in the year 1872, at the age of 19. Taking a great interest in the Volunteer movement in Natal, he joined the Royal Durban Rifles—a corps just being formed, and which has since done good service for the Empire during the late war. Mr. Kemp formed one of the escort to Sir Theophilus Shepstone, K.C.M.G., when he went to Zululand for the coronation of Cetewayo in 1873, and was also with Sir Theophilus in Pretoria when he formally annexed the Transvaal on behalf of the British Government in 1877. Subsequently Mr. Kemp travelled a great deal in the interior, shooting, bringing down great quantities of ivory and feathers to the coast. Mr. Kemp became financially connected with a business at Bamangwato, which unfortunately—owing to mismanagement and the outbreak of the Boer war of 1881—left him practically a ruined man. It was then, to retrieve his fallen fortunes, he began his business career. He instituted a large transport service from Natal for the conveyance of machinery and goods to the goldfields of Barberton and Johannesburg. Later on, when the railway was constructed to Johannesburg, he opened a forwarding agency at Charlestown, on the Natal border, and ten years later he removed his business across the border to Volksrust, where he is contractor to the C.S.A.R. Mr. Kemp is a man of some local influence. Besides being Chairman of the Council he is senior captain in the Eastern Rifles, and commands "C" Squadron, which he was principally instrumental in raising. It is also through his personal effort that a very creditable band of 25 performers has been organised amongst the men of the squadron. Mr. S. Bromley Kemp is a Justice of the Peace, churchwarden of the Church of England, member of the Executive Committee of the Agricultural Society, and Chairman of the Progressive Association for the district (for which he is representative member of the Central Executive in Johannesburg). He possesses several thousand acres of valuable property in both Natal and the Transvaal, and is going in for sheep farming to a considerable extent, besides schemes of irrigation

POST AND TELEGRAPH OFFICES, VOLKSRUST.

VOLKSRUST.

1.—Railway Goods Shed. 2.—Dutch Reformed Church. 3.—A Residence at Volksrust.
4.—Municipal Buildings, Market Square. 5.—Masonic Lodge.

and cultivation of land. Mr. Kemp is very popular with both British and Dutch residents of the town and district, and is deservedly respected. He is the principal shareholder in the *Recorder* newspaper, which is being run by a syndicate on Progressive lines.

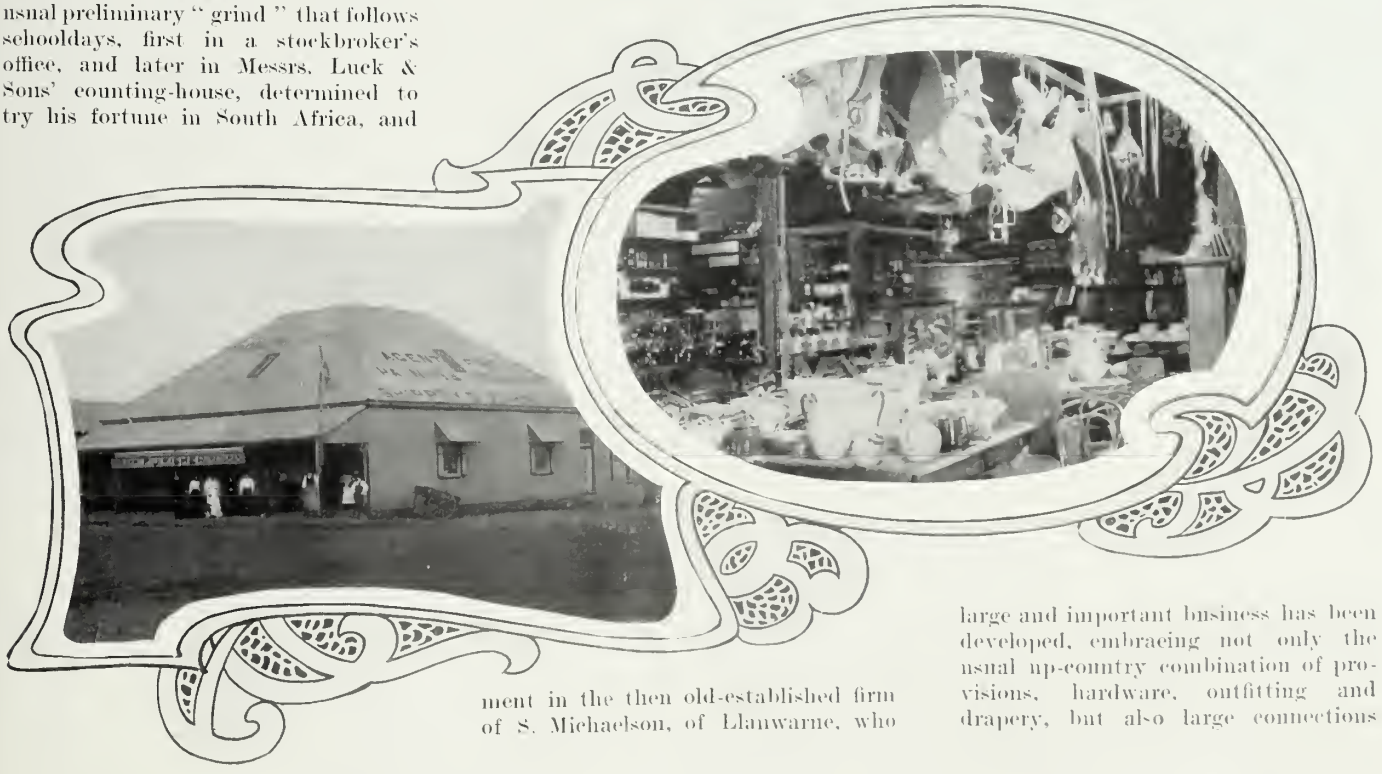
Mr. D. ALEXANDER.

Mr. D. Alexander, who was elected to the Municipal Council of Volksrust in 1905, is a native of Scotland. He arrived in South Africa in 1879, during the time of the Zulu war, and established himself in business as blacksmith and wagonmaker in Pietermaritzburg, Natal. Mr. Alexander followed the railway as it pushed through towards the Transvaal, opening business at Newcastle, and finally locating at Volksrust, over the border, in 1890. There he has worked up a large business. Mr. Alexander is a member of the local Caledonian Society, and he takes a very keen interest in all matters appertaining to the prosperity of the township and district.

MR. D. ALEXANDER'S SMITHY, VOLKSRUST.

Mr. FREDERICK JAMES FISHER.

Mr. F. J. Fisher, J.P., Deputy-Chairman of the Volksrust Town Council, was born in London in 1868, and, after a short but brilliant career at the Haberdashers' School and the usual preliminary "grind" that follows schooldays, first in a stockbroker's office, and later in Messrs. Luck & Sons' counting-house, determined to try his fortune in South Africa, and sailed for Durban in 1887. After a few years spent in the warehouse of the late Mr. R. W. Evans, and subsequently with Messrs. W. Dunn & Co., the well-known South African merchants, Mr. Fisher left for the Transvaal in 1893, to take up an appointment in the then old-established firm of S. Michaelson, of Llanwarne, who possessed probably one of the largest Boer businesses in the south-eastern Transvaal. After eighteen months' experience with that firm, Mr. Fisher decided to start business for himself. Success smiled on him from the first, and from very small beginnings a large and important business has been developed, embracing not only the usual up-country combination of provisions, hardware, outfitting and drapery, but also large connections



VOLKSRUST.

1.—Business Premises of Mr. F. J. Fisher, Langes Nek-street. 2.—Interior of Mr. F. J. Fisher's Store

in wool, produce, coal, and timber. When the war broke out Mr. Fisher closed his doors, abandoned the premises, and retired to British territory. With the occupation of Volksrust by General Buller, Mr. Fisher returned to the township, to find his premises intact, although practically the whole of his large and valuable stock had been looted by the Boers in his absence. Nothing daunted, he figuratively and literally took off his coat and started once more to rebuild the shattered fortunes of his firm. His untiring energy and grim determination were again crowned with success. To-day Mr. Fisher's business is one of the best in the Wakkerstroom district. Mr. Fisher is a Government nominee of the Health Board, and a director of the local

Volksrust, the oldest and principal of these being Mr. S. Hooey, who is a native of Ireland, where he qualified for his calling. Prior to moving to South Africa, he held the position of manager for Mr. W. F. Wells, the President of the Pharmaceutical Society of Dublin. Mr. Hooey arrived in South Africa in 1901, remaining for a period in Ladysmith (Natal) with Messrs. Adams & Co., chemists. He then went to Volksrust to open and manage a branch for this firm, taking charge in 1902, and he himself acquired the business three months later. Mr. Hooey has qualified as L.P.S.I. (Dublin), and also in connection with the Apothecaries' Hall in the same city. He is a member of the Transvaal Pharmaceutical Society, was elected to the Volksrust Muni-

of which have already attained popularity throughout the Colony.

Mr. J. A. F. ORTLEPP.

Mr. J. A. F. Ortlepp, who is a member of the Volksrust Municipal Council, arrived in the Transvaal in 1875, and settled with his parents in the Utrecht district (then a portion of the Transvaal Republic), his father having previously been a farmer in the Colesberg district, Cape Colony. The family engaged in farming pursuits, which Mr. Ortlepp, sen., still carries on, at Melmoth, in the Entonganie district of Zululand. Mr. Ortlepp entered upon a commercial career, to which he had served his apprenticeship. He, however, re-engaged in farming for a period of 16 years, and

INTERIOR OF MR. HOOEY'S PHARMACY.

building society. In 1905 he was appointed Deputy-Chairman of the Municipal Council. He takes a keen interest in political affairs, and is a determined opponent to the threatened influx of Asiatic traders into the Colony, who, encouraged by the change of government, are making strong efforts to effect a revision of the laws passed against them by the late Republic. Mr. F. J. Fisher is the only licensed dealer in arms and ammunition in the Wakkerstroom district.

Mr. S. HOOEY.

The dispensing and pharmacy profession has two representatives in

cipal Council in 1905, and in Committee work was appointed Chairman of the Health and Water Committee. His business establishment is situated in Joubert-street, facing the Market Square. It is decidedly one of the finest chemist's stores in the country towns of the Transvaal. Our accompanying illustration will show that it is spacious and well-fitted. The fixtures and decorations were undertaken throughout by the present proprietor. The stock of the establishment, in addition to the usual drugs and chemicals, includes a large quantity of patent medicines, as well as photographic material and cameras. Mr. Hooey manufactures also some of his own special preparations, several

once more resumed commercial pursuits in 1892, when, together with his present partner, Mr. F. P. Jacobsz, he purchased what was then a small general merchant's business in Volksrust. This has now developed into one of the largest concerns in the township. Mr. Ortlepp was elected to the first Municipal Council, formerly known as the Urban District Board, as gazetted in December, 1903, and later given its present title by virtue of Ordinance of 1904. He has the distinction of being the only present member who has each time been re-elected. Mr. Ortlepp evinces considerable interest in scholastic, church, and all public matters in which he takes a prominent part.

Mr. BERNARDUS PIETER JOHNSTONE.

The subject of this sketch is a farmer of considerable prominence in the Wakkerstroom district. Mr. Johnstone's father was a Scotchman, and he himself was born in Pietermaritzburg, in the year 1844. He attended as a child the Government school in the Natal capital, and afterwards learned and worked at the trade of wheelwright. He lost his father when he was six years of age. At 21 he trekked to Wakkerstroom (then labouring under the unwieldy cognomen "Martinus Wesselsstroom"), and there he worked at his trade for a period of five years. He acquired some stock, consisting at the start of 250 sheep, 40 head of cattle and two horses, and then hired the farm Wynberg, in the Wakkerstroom district, afterwards purchasing 14 acres of land adjoining. When his son married he bought the farm Wynberg from ex-General Joubert's brother for £3,000. Mr. Johnstone brought up a large family of 13 children, of which seven are married. In 1869 he became the owner of the farm Dassiesfontein, a property of 14,000 acres, on which he was residing when these notes were written. Mr. Johnstone "runs" 2,300 sheep, over 300 head of cattle, and 150 horses on his property. This he explains is only stock gathered together since the war, during which period losses were naturally very heavy. Industry and enterprising perseverance have raised Mr. Johnstone to affluence in comparison to the position of many of his more sluggish neighbours. He recalls a very hard life in his early years, when he had to depend entirely upon his own exertions, having practically no capital to commence upon. In his younger days—Mr. Johnstone is proud to admit—he herded his own sheep, but now in more prosperous times he employs no fewer than 25 natives on his estate. The stud sheep raised by Mr. Johnstone are widely and favourably known through Natal, the Orange River Colony, and the Transvaal. His wool gained a gold medal at the Paris Exhibition in 1887. Stud rams used in his breeding stocks have been drawn from France, and latterly from Australia. Mr. Johnstone disposes of his wethers, and sends to market each season about 70 bales of wool. He has a personal conviction, based on a lengthy experience, that the Wakkerstroom district is the best in the country for wool-growing. During the war, Mr. Chris. Botha, son-in-law of Mr. Johnstone and brother of ex-General Botha, caused the homesteads on his own farm and that of Mr. Johnstone to be burnt when—the Boer cause having become hopeless—capitulation to the British took place. Mr. Johnstone at the period of writing is a hale and hearty man in spite of his 61 years, many of which have been years of hardship and struggle. The name by which this sturdy Transvaal farmer is known to the natives in the vernacular is "Mahamoola," a tribute to prowess and pluck displayed on an occasion in 1865, when a Zulu attack

VOLKSRUST.

1.—Exterior of Ortlepp & Jacobsz's Store, Joubert-street.
2.—Store from Langes Nek-street.
3.—Grocery Department.
4.—Drapery Department.

1.—A Corner of the young Orchard on Mr. B. Johnstone's Property. 2.—Another View of Mr. Johnstone's House near Volksrust. 3.—Mr. B. Johnstone and his Sons, with three Prize Rams and young Cattle, on his Farm Dassiesfontein, near Volksrust. 4.—Residence, looking South. 5.—Homestead of Mr. F. A. J. Johnstone, Wynberg, Wakkerstroom district. 6.—Mr. B. Johnstone and four Sons, showing residence in the background.

was repulsed near Wakkerstroom, when the blacks were endeavouring to break through the resistance of the settlers. Sixteen white men took part in the engagement, which lasted only three-parts of an hour, but ended in the killing of many of the warriors and the capture of 500 braves of the venturesome Zulu impi. Mr. Johnstone's eldest son, Mr. F. A. J. Johnstone, the present owner of "Wynberg," is also a fine stamp of the Colonial farmer. The entire estate of the Johnstone family is 9,000 morgen. Mr. J. M. Johnstone, an unmarried son, owns "Schoongezicht" (*Anglice*, "Fair View"), an adjoining farm. The third son is Mr. Bernadus Naude Johnstone, and the fourth is Mr. John Henry Johnstone. All these possess farms which have been given them by their father. An interesting picture is shown of Mr. Johnstone and his four sons.

THE TRANSVAAL HOTEL, VOLKSRUST.

Messrs. ORTLEPP & JACOBSZ.

This firm of general merchants has a store at the corner of Joubert-street and Langes Nek-street, Volksrust, which occupies an area space of 90 ft. by 90 ft. Messrs. Ortlepp & Jacobsz import almost everything they sell, and their trade extends into the interior as far as Ermelo and Piet Retief. They carry a very considerable stock, the approximate value of which is placed at £18,000, and they have a separate kafir store in connection with their undertaking. An important part of the firm's business is the purchase of local produce. In the 1904 season they were the largest purchasers of wool in the district, and in that year handled no less an amount than 1,200 bales. Messrs. Ortlepp & Jacobsz keep in their employ a staff of 30, of which number 14 are whites. Mr. Francois Paul Jacobsz, of this firm, was born in the Senekal district, Orange River Colony, and was educated at the Grey College, Bloemfontein. Prior to joining his present business Mr. Jacobsz was associated with farming and mining interests. He takes an active part in all public matters, is Chairman of the Wards Committee of "Het Volk," Chairman of the Volksrust Chamber of Commerce, Chairman of the National School Committee, and fills other prominent local offices. Owing to the personal energy of the members of this firm funds were raised for the establishment of a Dutch Reformed Church for Volksrust, at a cost of £2,000. The edifice was opened for public worship on the 2nd December, 1905.

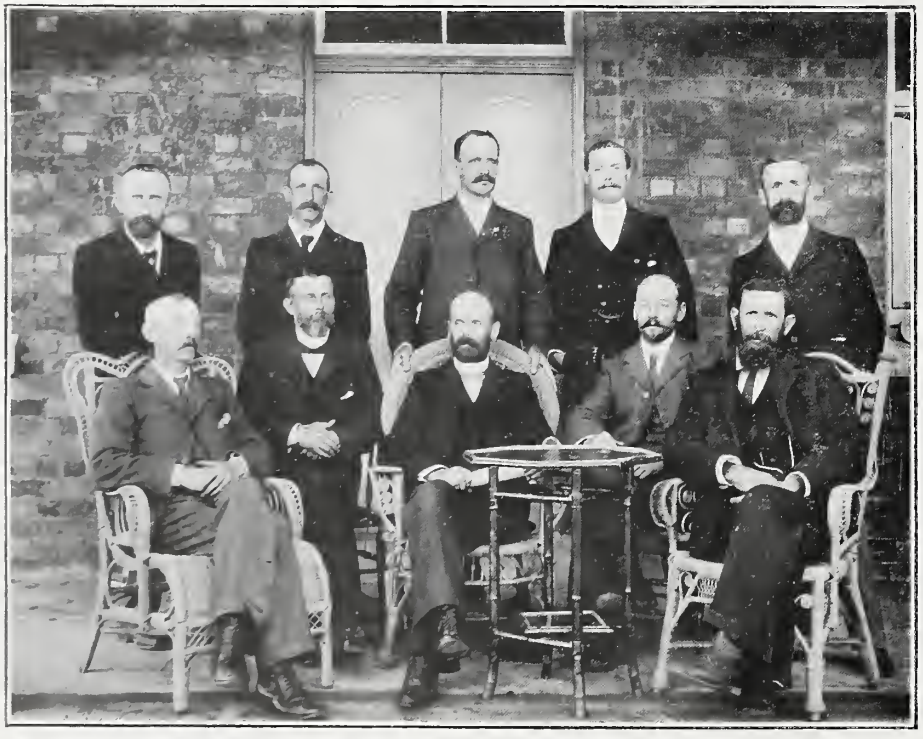
THE TRANSVAAL HOTEL.

The Transvaal Hotel is the oldest establishment of the kind in Volksrust. It was renovated by the present proprietor, Mr. S. C. Sonnenberg, in July, 1905. For a country town hotel it can be confidently recommended as being homelike and comfortable. The *cuisine* and attendance are decidedly good, and the rooms are clean and well-appointed. The hotel faces the municipal offices on the Market Square, and is therefore centrally situated. Mr. Sonnenberg is also the proprietor of the Victoria Hotel, Dundee (Natal), and of the Dundee and District Club. He is German by birth, coming from Hamburg. He has been in South Africa since 1874, and for 24 years has been hotelkeeper. As a caterer Mr. Sonnenberg holds very high credentials.

Panoramic view of Wakkerstroom, capital town of the district bordering Natal and Swaziland (formerly known as "Martinus Wesselsstroom").

Wakkerstroom.

The town of Wakkerstroom, which is situated immediately within the Transvaal boundary on the Natal border, was known prior to the annexation as Martinus Wesselsstroom, but owing to this unwieldy name the authorities have renamed it after the district of which it is the capital. The town lies directly under Laangberg, which forms a part of the Drakensberg range, and occupies an area of approximately 20,000 morgen. It is admirably laid out, and was surveyed by Dirk Cornelius Uys, one of the original *voortrekkers*. The old gentleman is now (1905) 92 years of age. In the absence of the usual instruments, Mr. Uys (who was not a professional surveyor) resorted to ingenuity to provide himself with the means of doing the work. He shot an eland, cut up the hide in such a way that it made one large string, and this he used as a measuring tape to lay out the streets and erven. A central feature of this pretty township is the Dutch Reformed Church, which was erected in 1901. In 1903 an elective Urban District Board was created. This Board was declared a Municipal Council in 1904, with nine members, Mr. Jolliffe being the Chairman. The Municipality is contemplating the early construction of waterworks, for which the Council recently succeeded in raising a loan of £5,000. A good deal has been done by the Council in the construction of streets and the planting of trees, in addition to which they have erected their own council chambers. Part of the magnificent



THE MUNICIPAL COUNCIL, WAKKERSTROOM, 1905.

Mr. Dirk Cornelius Uys,
a *Voortrekker* who laid out the Township of Wakkerstroom. (92 years of age.)

WAKKERSTROOM,

1.—The Town Offices. 2.—Anglican Church. 3.—The Union Church. 4.—The Dutch Church, in the centre of Church Square.
5.—Masonic Lodge. 6.—Seminary School.
7.—Mr. Rider Haggard's residence, mentioned in the novel, "Jess." 8.—Post and Telegraph Offices.
9.—Public School.

town lands, in extent approximately 14,000 acres, are being laid out in connection with a land settlement scheme by the Municipality. The individual holdings are to be from 10 to 100 acres, according to the requirements of settlers. The freehold of the land can either be purchased or the holding acquired on lease on very advantageous terms. Particulars regarding this are obtainable at the Town Clerk's office.

There is a good Government school in the town, to which a system of secondary education has been added. All elementary education in this school is given free.

Gold has been discovered in the district near Wakkerstroom township, both in quartz and banket. Very little prospecting has been done, but old residents are unanimously of opinion that the precious metal exists in payable quantities.

Mr. J. J. JOLLIFFE, J.P.

Mr. Jolliffe, J.P., the first Chairman of Wakkerstroom Municipal Council, is a native of Salisbury, England. He arrived in South Africa in 1889. Since 1895 he has been manager of Messrs. Harvey, Greenacre & Co.'s business in the township, the branch being established in that year. In 1903 the firm added considerably to their premises, which now consist of a splendid

double-storey building with a frontage of 64 ft. facing Church Square. This establishment is replete with a very large stock of general merchandise.

THE STORE OF HARVEY GREENACRE & CO., WAKKERSTROOM.

The firm does the largest business in the district.

Mr. J. A. GRIBBIN.

The subject of these notes, who at the time of writing occupies the position of Deputy-Chairman of the Wakkerstroom Municipal Council, was born in Manchester, England, and made his first appearance in Natal in the year 1882. He remained in that Colony for two years, and afterwards proceeded into the Transvaal and settled in Wakkerstroom, where he opened a general store. At the end of 1905 he had the intention of giving up business and going in for sheep farming, as he owns land in the district. Mr. Gribbin holds the position of R.W.M. of the Wakkerstroom Masonic Lodge.

Mr. ALGERNON CHARLES TRANGMAR.

Mr. A. C. Trangmar, who is a member of the Wakkerstroom Municipal Council, is a native of Sussex, England. After finishing his public school and university career, he spent some years ranching in Western Texas. During this period in his experiences he held several public posts, amongst others that of deputy-sheriff for his county.

The Rev. D. P. Ackerman, Dutch Reformed Church, Wakkerstroom.

Mr. Trangmar returned to England in 1901, there joining the South African Constabulary, and he arrived in South Africa on the day after the declaration of peace. He completed his three years' term of service with the corps in June, 1905, and immediately started business for himself in Wakkerstroom as auctioneer and general agent. Four months later Mr. Trangmar was elected to the Municipal Council. He is a member of the Health, Works, Parks and Forestry Committees of the Council.

C. Kershaw Barry, J.P., Solicitor, etc., Wakkerstroom, Transvaal.

The Rev. D. P. ACKERMAN.

The Rev. Daniel Pieter Ackerman, minister of the Dutch Reformed church, was born at Richmond, Cape Colony, in 1849. He was educated at the Theological Seminary, Stellenbosch. Two years later Mr. Ackerman took up the ministerial charge at Wakkerstroom, where he has remained throughout all the fortunes and vicissitudes of that township.

Mr. THOMAS ALFRED BRINDLEY.

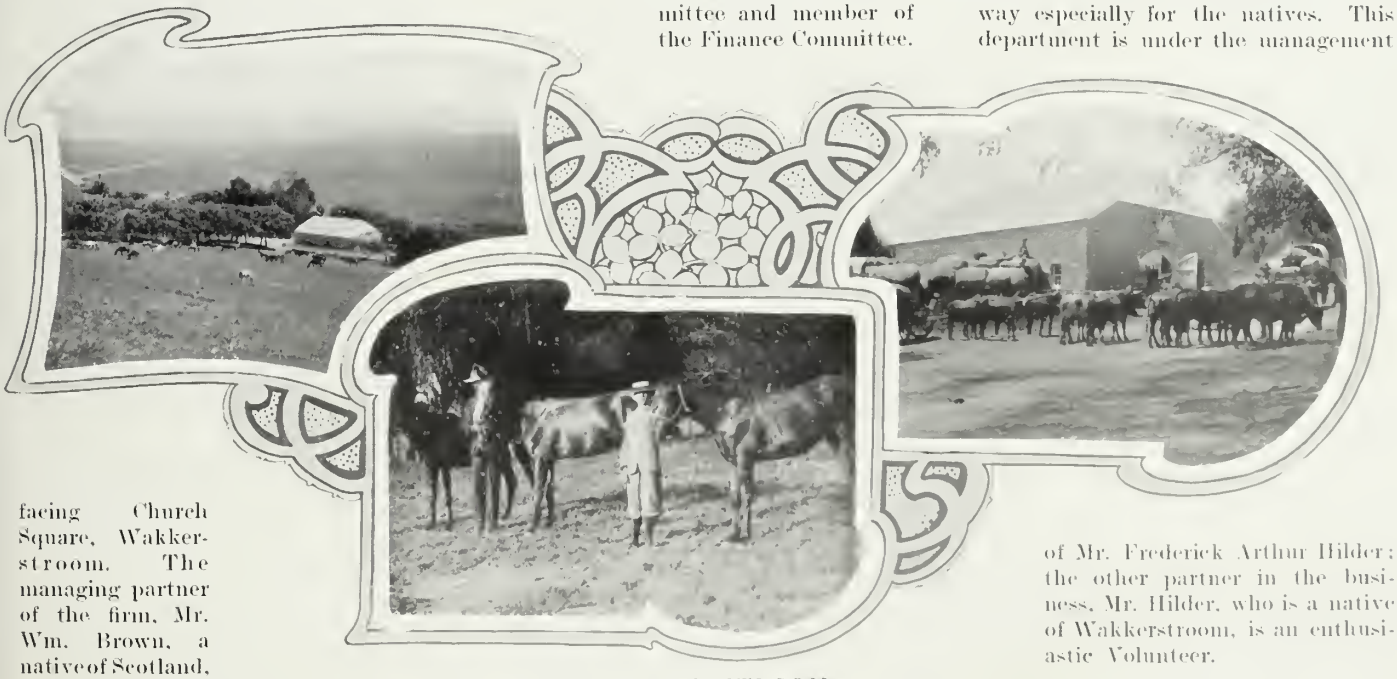
Mr. T. A. Brindley, who is a general storekeeper in Wakkerstroom, to which he adds a bakery business, has lived in South Africa 25 years. He settled in Pietermaritzburg in 1882, two years after his arrival in the country. With the intermission of four years, during which Mr. Brindley was in Ladysmith, he has resided the whole of the time in the Transvaal. In 1902 he settled in Wakkerstroom, and opened his present business. Mr. Brindley was elected to the Municipal Council in 1905, and is a member of the Parks and Forestry and Health Committees. He is an enterprising man, popular in the township, and is apparently carrying on a prosperous business.

Messrs. WILLIAM BROWN & CO.

Messrs. William Brown & Co., general merchants, occupy a large store, of which the frontage is 40 ft., facing Church Square, Wakkerstroom. The managing partner of the firm, Mr. Wm. Brown, a native of Scotland, arrived in South Africa in 1894. A few months after landing in the country he made his way to Wakkerstroom, and took over as proprietor his present store in 1902. He was a member of the former Urban District Board, and was elected to the Municipal Council in 1903, being Chairman of the Parks and Forestry Committee and member of the Finance Committee.

STORE OF W. BROWN & CO., WAKKERSTROOM.

Messrs. Brown & Co. are the largest buyers of wool, mealies, and other produce in the district. In the interior of their store is displayed a well-selected and comprehensive stock. In addition to their main store they have a separate establishment devoted to the native trade—being the only firm in the township catering in this way especially for the natives. This department is under the management of Mr. Frederick Arthur Hilder; the other partner in the business, Mr. Hilder, who is a native of Wakkerstroom, is an enthusiastic Volunteer.



WAKKERSTROOM.

1.—View of Mr. Fick's Farm: breeding mares in foreground.
2. A clip of Mr. Fick's wool ready for Market.
3.—Stallions belonging to Mr. Fick.

Mr. N. H. FICK.

Among the successful farmers of Wakkerstroom district may be mentioned Mr. Nicolaas Hendrik Fick, sen., whose farm "Langberg" is in extent 4,000 morgen. To this large holding an adjoining farm of 3,000 morgen has been added, and these properties were stocked at the time of writing with upwards of 5,000 Merino sheep, from 600 to 700 head of cattle, and 85 horses. This stock is the joint property of Mr. Fick and his sons, three of whom are farming on their father's property. According to local custom the stock is driven down to Low Veld pastures for winter feeding, may be watered in the dry months of the winter season. Some alarm was felt at the lessening rainfall, which had been steadily decreasing until 1905. Continuous rains have, however, fallen since the early part of 1906, which will mean greatly increased crops for this season. Mr. Fick has been a resident of the Wakkerstroom district since 1864. He has large dealings in stock in Johannesburg as well as locally.

Homestead, "Daggakraal."

Mr. W. GOUWS.

On the farm "Daggakraal," which was totally denuded of stock during the war, there are now running some 2,800 Merino sheep, 68 head of cattle, and 26 horses. This farm is the property of Mr. William Gouws, who settled in the Wakkerstroom district in 1873, where the result of his long experience is that sheep farming is one of the best paying industries; horse-breeding, however, also gives lucrative returns. A great deal of pasturage is necessary for this purpose, as horses generally require the run of the whole farm, and they so easily show signs of distress and weakness if denied space and freedom. In this district it is easy for horse-breeders to lease portions of adjoining farms, as most of the farmers in the neighbourhood have more ground than they can cultivate. In rearing sheep, Mr. Gouws's views coincide with those of other thoughtful and progressive stock farmers. It is necessary to abandon the wasteful practice, so generally in vogue, of trekking the flocks to the Low Veld pastures during the winter months. To avoid this fodder must be grown for winter feeding. For this purpose rooigrass, mealies, mangold-wurtzel, kafir pumpkin, and hard-skin pumpkin—all easy crops to raise—have been found most suitable. Mr.

Haymaking, Mr. Gouws's Farm, "Daggakraal."

Mr. W. Gouws.

Gouws is of opinion that a farm 2,000 morgen in extent could run 3,000 sheep, and with the addition of 500 morgen under hay (rooigrass) and 200 morgen under pumpkin and mangold-wurtzel, this should suffice for the winter feed. Mr. Gouws is a member of the Agricultural Society for the district of Wakkerstroom, and holds Progressive views on most subjects. He has made some interesting observations on the rainfall, and states that from 1903 the rainfall steadily increased, until 1905, when it began once more to rise, which bears out a theory he has formed, that the increase and decrease of the rainfall in South Africa come in regular alternating with the exception of the horses, which remain on the farm. About 500 acres under cultivation on "Langberg" produced in 1905 upwards of 80,000 bundles of forage and 300 bags of mealies and barley. No irrigation has as yet been attempted, but a scheme is being arranged by which the property

cycles of 12 years. This will furnish an interesting point for future observations. While boring for water on the "Daggakraal" farm, a seam of coal six feet in width was discovered. This mineral is found in good quality and quantity on almost every farm in the Wakkerstroom district.

Mr. E. W. JOHNSTONE.

The Wakkerstroom district, in the Eastern Transvaal, besides possessing stretches of lovely scenery, is rich in agricultural possibilities. Wheat, barley, forage, maize, potatoes, and various kinds of vegetables may be cultivated in abundance, and fruit comes to great perfection. Stock also can be raised successfully. Both the agricultural and stock-raising industries are pursued on the farm "Chance" belonging to Mr. Edmund Wilhelm Johnstone, of Wakkerstroom. This farm comprises about 3,000 morgen, is free from stock diseases, and possesses beautiful soil, in part of a dark sandy turf, and in part red sand. After years of cultivation under annual crops, without any fertilising system whatsoever, it continues to be increasingly productive. Mr. Johnstone's beautiful homestead was utterly destroyed during the war, although it was under British protection, but by hard work and perseverance on the part of the proprietor the home has been rebuilt and the farm re-stocked and re-planted, with the addition of many fruit trees. It will take some time, however, before it presents its former picturesque appearance. The farm at the time of writing carries 2,100 head of Merino sheep, 130 cattle, 20 horses, and 30 mules. About 100 acres of "lands" are under cultivation, producing cereal crops of all kinds, which are sent to the Johannesburg and other markets. There being only an occasional market for fruit, at Wakkerstroom and Volksrust, most of the deciduous growths on the farm "Chance" are dried or preserved. There are 80 acres of evergreens (pines, eucalyptus, and green wattle) on the property, and there is also a stretch of natural bush. 150 acres in extent, of hard indigenous woods admirably suited for wagon-building purposes. Coal is found in abundance, seams of 9 ft. with a width of 21½ ft. respectively running for several miles in the locality. Mr. Johnstone is a Resident Justice of the Peace for the district, and interests himself greatly in politics and native affairs. He expresses the view that the native only requires just and firm handling for the district to obtain as much labour as is necessary. He himself can boast that two native families living on his farm have supplied him with labour for the last 33 years. Mr. Johnstone is a Natalian, and settled

Mr. E. W. Johnstone and Family, Farm "Chance," Wakkerstroom district.

at Wakkerstroom in 1863. He is a great advocate of winter feeding for stock, to obviate the necessity of driving the herds down to the Low Veld pastures. With the proposed extensive cultivation of lucerne, which produces several crops a year, it should be easy to provide forage for the winter months. He had the honour of entertaining Lord and Lady Selborne during the High Commissioner's tour through the Eastern Transvaal, on which occasion His Excellency presented him with his signed photograph.

Warmbaths.

Situated on the direct line of railway about half-way between Johannesburg and Pietersburg, in the Waterberg district, amid interesting geological surroundings, is a natural sanatorium taking the name of Warmbaths. The mineral springs in the immediate vicinity have a temperature varying from 120 deg. to 140 deg. Fahrenheit. Warmbaths, which by reason of the recuperating qualities of the waters has for some time been a resort for invalids, can scarcely be termed a "dorp." The entire buildings consist of an hotel, a small store, a telegraph office, and the public baths established there by the Transvaal Republican Government in 1895. The baths were erected on the recommendation of the medical faculty of the Transvaal, to whom the curative virtues of the hot springs had become known. A description of these baths should prove of interest. The spring itself is encased in an octangular building, the interior being a well into which it discharges. The depth of this well is about 15 feet, and it is constructed so as to retain the water to a height of some 2 ft. 6 in. above ground level. Mains are laid on from this well—one to a reservoir about 100 yards distant, and another

"Horseshoe Fall," a pretty spot three miles from Warmbaths.

WARMBATHS.

supplying the hotel and also the bathrooms adjacent to the main building. Return pipes are laid on from the reservoir, which is an open circular tank built of stone quarried in the vicinity, in which the water is allowed to cool, thus supplying the bathrooms with both hot and cold spring water. Attached to the main building are 16 compartments, each a natural vapour bath, the temperature varying from 90 deg. to 100 deg. Fahrenheit. The bathing rooms are a series of cottages, each divided into six compartments, comfortably fitted up, some being specially reserved for ladies. In addition there are four isolated bathrooms for the use of those who may be suffering from contagious disease. Five other bathrooms are reserved for the use of natives. The charge made to the public is 1s. for a single bath, or books of 12 or of 25 tickets are to be obtained at 10s. and 20s. respectively. Dr. Hahn's analysis of the springs water way be given here :—

Carb. soda	..	16·84 grs.
Salt	.. ..	9·17 ,,
Carb. lithium	..	·12 ,,
Calcium carb.	..	1·82 ,,
Iron	.. ..	·29 ,,
Sulph. magnesia		·36 ,,
Silica	.. ..	2·45 ,,

THE WARMBATHS HOTEL.

The establishment appears to be well looked after by a Government official, who is provided with a residence adjacent to the springs.

In the district surrounding Warmbaths are numerous important fruit farms, on some of which are as many as 25,000 orange trees. Indeed, this fruit grows luxuriantly in the neighbourhood.

The Waterberg ranges are on the north-east of Warmbaths, and are known to contain valuable deposits of copper and tin. Active prospecting has been going on for some time past, with the result that a copper proposition is likely to be working very shortly.

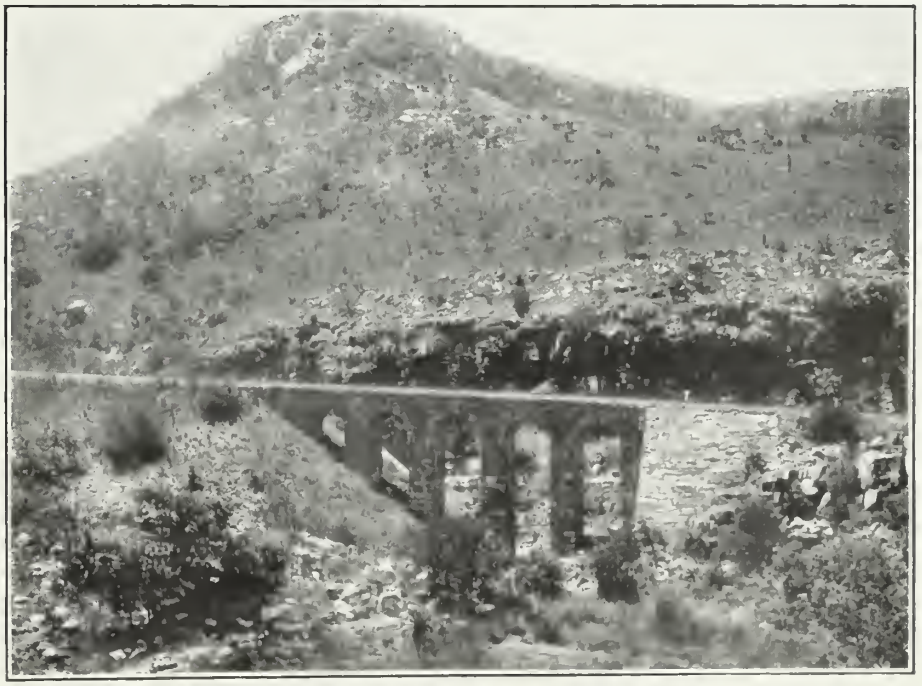
WARMBATHS HOTEL AND SANATORIUM.

Visitors will find good accommodation at the Warmbaths Hotel and Sanatorium, which is the property of Geo. Sutter & Co., and was erected by them about twelve months prior to the outbreak of the Anglo-Boer war. Thus the hotel dates its existence back to about 1898. It is situated within a few minutes' walk of the railway station, being distant but a few yards from the Government hot spring baths. The hotel, which is a single-storey building, covers an area of several erven. The front is of imposing design, built of brick, and with walls of 9 in. thickness. The entire foundations are of stone of excellent quality, quarried in the adjacent hills. On the right of the entrance hall is a large and well-appointed saloon bar, where are kept stocked the best-known brands of wines and spirits. Leading off this saloon is an excellent billiard room fitted with two Burroughes & Watts tables. These are kept in use from early morning to closing time by the many visitors. There are four reading rooms in the hotel, and a large dining hall capable of seating 125 persons. The bedrooms, numbering in all 56, well furnished and lighted, are situated on the sides of a square, in the centre of which is a greenhouse covered with creepers and planted around with flowers, with an aviary at one end. A distinct feature of the sanatorium are the baths. These, numbering 24, supplied from the hot springs, are included to visitors in the tariff of the hotel. The buildings are lighted throughout with the "Hera" light. Mr. Sommerville Murray, whose many years' experience highly qualifies him for the position, is the business manager. The firm of Geo. Sutter & Co. have a store adjacent, and are general providers, being in addition the only butchers and bakers within a radius of 20 miles.

Waterval Boven.

On the Pretoria-Delagoa line, in the district of Lydenburg, and distant by rail 212 miles from Pretoria, and

Waterval Boven, on the Pretoria-Delagoa Bay line.



Section of track near tunnel, Waterval Boven, Pretoria-Delagoa Bay line.

137 miles from Delagoa Bay, is the little railway settlement of Waterval Boven, which boasts one of the few pieces of striking scenery on the High Veld—namely, the Falls on the Elands River, from which it takes its name. It is situated on the farm "Doornhoek," formerly the property of Mr. C. J. Coetzee, of Carolina, and now owned by Mr. A. L. Murray, of Waterval Boven. It was named by the "Nederlands Zuid Afrikaansche Spoorweg Maatschappy" (Netherlands South African Railway Company). This Company, in 1892, expropriated 90 morgen of the "Doornhoek" property, on each side of the railway line, for a depôt, with sheds and loco. shops, which are retained under the present administration. Waterval Boven is also the headquarters of the Central South African Railways Engineer for the Eastern line. The running sheds and locomotive shops established there give employment to about 300 white men, and a large number of natives. The descent from Waterval Boven to Waterval Onder ("Upper Waterfall" and "Lower Waterfall") in the Elands River valley is tremendous, six hundred and eighty-two feet in little over four miles; and, to negotiate this gradient, which is acknowledged to be one of the finest and most daring feats of engineering in South Africa, has been carried out. The trains are worked upon a series of ratchets, for which special cog-wheel engines are used; this is known as the "rack" system. It commences from the eastern side of Waterval Boven station, where the special locomotives are stabled in sheds. Part of the journey is made through a tunnel about seven hundred feet in length, at the entrance to which is the track leading to the Falls. On emerging from the tunnel the drop begins in earnest, and the train skirts the edge of a breathless precipice, whence a fine view of grandly rugged scenery and a glimpse of the Falls are obtained. Waterval Boven is the last station on the High Veld on the run down to Delagoa from the Transvaal, and, with an altitude of about 5,200 ft. above sea level, it enjoys a beautiful and bracing climate, particularly in summer. It is, however, very cold in winter. It is free from the fever so prevalent in the Elands River valley, and since its establishment there have been no cases of serious epidemics or contagious diseases. For this reason it is a resort of health-seekers from the low-lying districts of Barberton and Komati Poort. To meet the demands of these visitors, and of the many railway employés who suffer from their sojourn in the fever zones, there is a Sanatorium and Convalescent Home about a quarter of a mile from the railway station, commanding a fine view of the Elands River valley, and cooled by pleasant breezes. Near this Sanatorium is a large compound belonging to the Witwatersrand Native Labour Association, with accommodation for 5,000 natives, where the levies recruited for work on the Rand mines are rested on their journey to the High Veld, and provided with suitable clothing for the colder climate of the Transvaal. At the time of writing, however, this compound was about to be abandoned. Dr. Wight, District

Cascade near Waterval Onder, Lydenburg District.

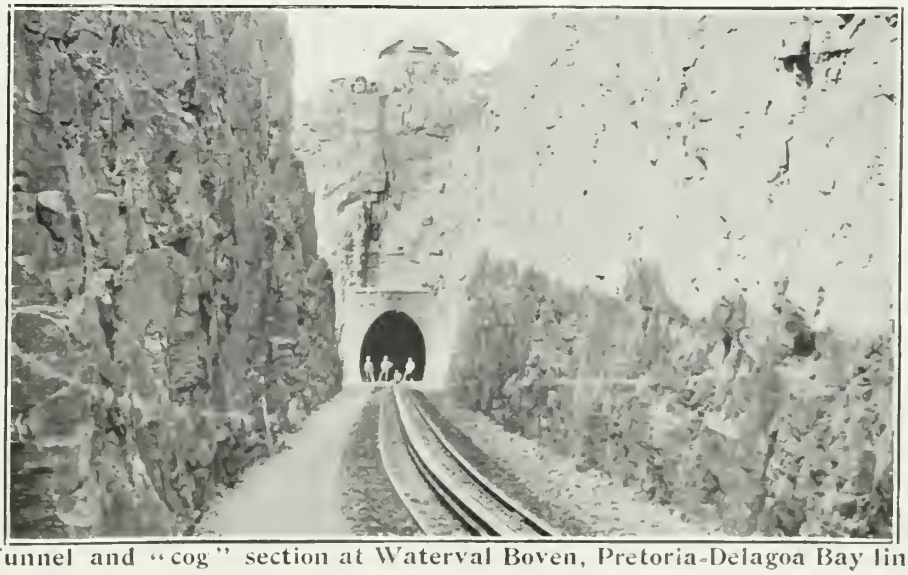
Waterval Onder, in the dip below Waterval Boven, on the Pretoria-Delagoa Bay line.

Surgeon, is retained by the railway administration as medical officer to the camp; he has lived at Waterval Boven for four years, and has the right of private practice, and is also medical officer for the Native Labour Association. He has made many useful suggestions for the improvement of the settlement, notably in regard to sanitary arrangements, and has prevailed upon the authorities to erect a much-needed compound for their natives outside the town, under the control and supervision of the Railway Engineer. The railway quarters are well built and substantial, of brick and stone, and the men have a Club for their special use. The employés are mostly married men, whose families live with them. There is a Government school suitable to the requirements of the district, and post, telegraph, and money-order offices. The Churches represented are the Anglican, the Wesleyan, and the Dutch Reformed; and also a native church under the control of the Wesleyans. There is a butchery and a bakery, a good hotel, and two stores. One of these—the more important—belongs to Messrs. Murray & Co., who also own the hotel. The oldest established business in the place is the butchery and bakery of Messrs. Button & Wentzel.

Messrs. A. L. MURRAY & CO.

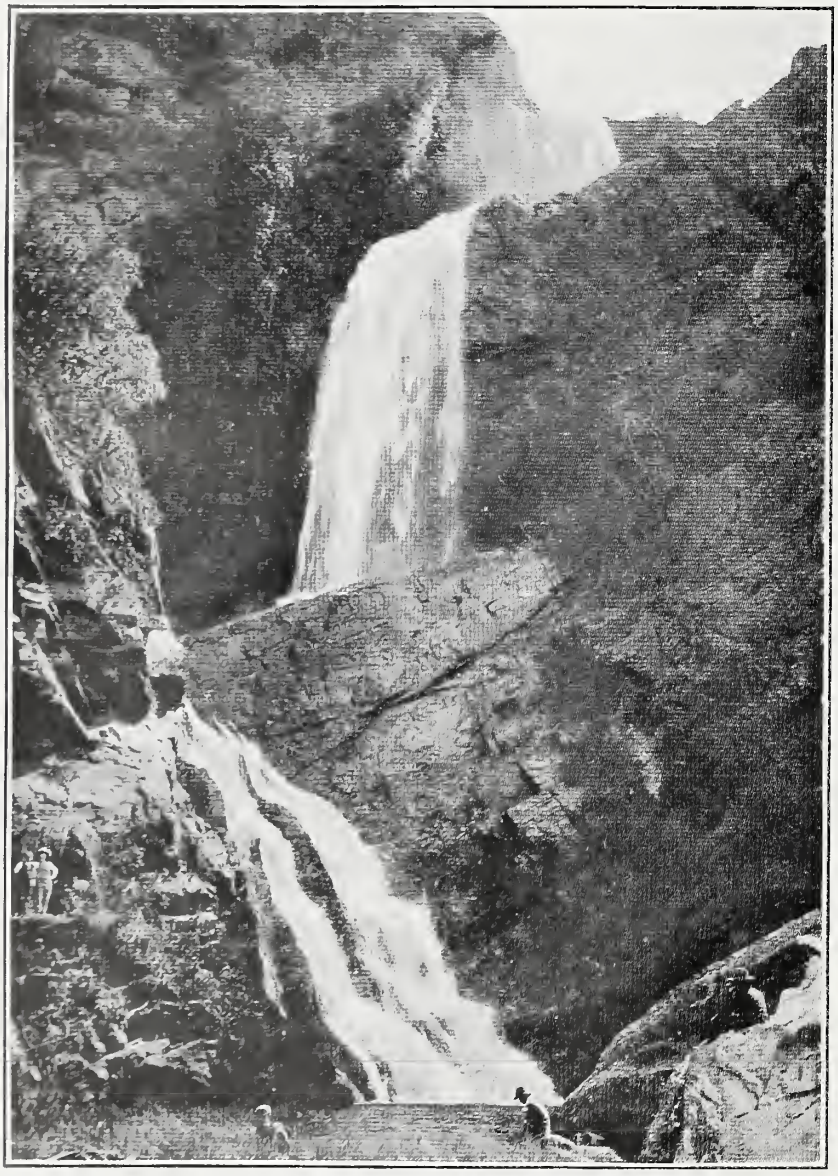
The firm of Messrs. A. L. Murray & Co., general merchants, has been established in many parts of the Eastern Transvaal since 1886, in which year it was originally founded at Barberton. Branches were formed in many other towns and settlements in this portion of the country, and existed until the war of 1899-1902, when most of them were disposed of or closed down, those that remain being the business houses at Barberton and Waterval Boven. Mr. A. L. Murray, the managing partner, is a native of Perthshire, N.B., and arrived in South Africa in 1870. Before settling in the Eastern Transvaal he spent some time in Natal. This gentleman purchased, in 1895, the farm "Doornhoek" on the Pretoria-Delagoa railway line, part of which was expropriated by the Netherlands South African Railway Company for railway purposes. Here Mr. Murray carries on extensive farming operations. Being a local landowner, and engaged in important business, he takes a deep interest in the agricultural and political advancement of the fertile eastern provinces of the Transvaal, and looks forward to the granting of full responsible government to the Colony as a great factor in the country's future prosperity.

The Waterfall at Waterval Boven, Lydenburg district.



Tunnel and "cog" section at Waterval Boven, Pretoria-Delagoa Bay line.

The Witpoortje Hotel.



The Witpoortje Waterfalls, near Krugersdorp.

Witpoortje.

There is not much to describe in the way of scenery in the vicinity of Witwatersrand, but a few places deserve special mention. Unquestionably the Witpoortje Gorge holds the premier position, and is the attraction to a great many visitors from Johannesburg and other parts on holidays and festive occasions. The Gorge is within half a mile of the Witpoortje railway station. It may be described as extremely bold and beautiful in outline. The ragged rocks are almost perpendicular, and a stream trickling through is responsible for verdant growth which shows in the rocky channel at the base of the kloof. This kloof extends for a distance of upwards of three miles. Various miniature streams which emerge from the crevices go to swell the rivulet, until at the end of the Gorge it forms during the rainy season a waterfall of beauty and some dimensions. Adjacent to the railway station is the Witpoortje Hotel, standing within a stone's throw of the line. This is a very popular resort, and richly deserves the patronage which it enjoys. The hotel is prettily built, and comfortably furnished. A large tennis court is one of the attractions provided for the resident guests. Mr. James Richardson, the proprietor, who is a native of Ayrshire, arrived in South Africa in 1880. Five years later he proceeded to Barberton, and there was engaged in constructing most of the battery plants for the mining companies in the vicinity. He left for Johannesburg in 1888, and followed the calling of builder and contractor, the trade for which he qualified. He afterwards conducted on his own account for a number of years the well-known Central Hotel at Roodepoort. He has been a steward of the Roodepoort Racing Club since its inception. Mr. Richardson satisfactorily disposed of his Roodepoort business, and with commendable enterprise built his present hotel, which was opened in 1904. He also took his share of responsibilities and entered military service when the war cloud burst over South Africa. He was attached to the Army Service Corps in the early stages of the war. Upon his return to Roodepoort twelve months before peace was declared he joined the Rand Rifles as a private, subsequently rising to the rank of lieutenant in charge of the Roodepoort company of the corps. Mr. Richardson was for a time a

member of the Roodepoort Municipal Council, and occupied the civic chair in 1905 during the absence in England of Mr. H. Ross Skinner, who was Mayor that year. Mr. Richardson is on the directorate of the Transvaal Paint and Colour Manufacturing Company, Ltd., the works of which are at Elandsvlei. He is also largely interested in numerous mining properties. He is a prominent Freemason, being P.M. of the Roodepoort Caledonian Lodge.

Zeerust.

Zeerust is the principal town of the fertile Marico district, in the Western Transvaal. It was laid out on the farm "Azea," which originally was the property of Mr. Caspar Coetzee. The town of Zeerust comprises 1,089 erven, with a commonage of 3,215 acres in extent. It is distant 130 miles from Pretoria, and some 36 miles from Mafeking. The district has been termed "the Garden of the Transvaal," on account of the loveliness of its

Dutch "Nachtmaal" at Zeerust.

ZEERUST.

1.—View of Zeerust. 2.—Market Square. 3.—Church-street. 4. Ex-Generals De La Rey and Smuts establishing a Branch of the Association "Het Volk" for Marico district.
5.—Scene near Zeerust. 6.—A Street in Zeerust.

ZEERUST.

1.—View of Farmhouse at Weltevreden, District Marico (the property of Mr. W. N. Glaeser).
2, 3 and 4.—The Farm Weltevreden.

Situated in the fertile valley of Klein Marico, this farm adjoins the village of Jacobsdal, and is seven miles distant from the town of Zeerust, on the main road from Ottoshoop. It is considered one of the most fertile farms in the Marico district, and has abundance of flowing water, having more than 250 acres of arable land under cultivation.

scenery and the luxuriant growth of trees and foliage. But little known prior to the war, its exquisite fertility was a source of amazement to the British troops who conducted operations in the Marico district, and stories of trees of enormous growth, of orange trees bearing as many as 10,000 oranges, and of the extreme beauty of the farm homesteads, were of frequent repetition at that time. This part of the Transvaal is as admirably adapted to agriculture as it is to fruit culture and forestry. The harvest for the year 1905 was estimated to reach 500 tons of wheat, 200 tons of chaff, 3,500 tons of maize and kafir-corn, 2,000 tons of oathay, and 1,300 tons of oranges and lemons, 60 tons of tobacco, 2,000 tons of timber, and wool, hides, poultry, and cattle in equally abundant quantities. This record, it is confidently believed, will be easily eclipsed in succeeding years, with increased cultivation and improved methods. The town is to be connected with Pretoria and Johannesburg in the Transvaal, and with Mafeking in Cape Colony, by railway, and this will add an enormous stimulus to industry in the district by opening up profitable markets and solving the transport difficulty. The population of the district, according to the census returns of 1904, was 1,295 Europeans and 1,242 natives. Zeerust has a Municipal Council, is a magisterial centre, and possesses its Chamber of Commerce and its Agricultural Society. The Government has a meteorological observation station at Zeerust, and there is also a Government nursery from which trees are supplied to the farmers of the surrounding neighbourhood. The plantation is laid out in the form of a park. The climate is fairly healthy, but fever is prevalent in the district. Horse sickness has been a special source of loss and anxiety to the farming community.

Mr. JOHANNES J. P. COETZEE.

Mr. Johannes J. P. Coetzee was born in Fauresmith, Orange River Colony, and arrived in Zeerust in 1903. His profession is that of accountant, sworn translator, and general agent, to which he combines the duties of secretary to the Marico Board of Executors and Trust Co., and also to the Western Extension Syndicate, Limited, the latter a mining proposition which is at present being rapidly developed. In connection with the accountancy branch Mr. Coetzee has by far the largest practice in the district, and the knowledge of law which he possesses stands him in good stead in his various avocations. Mr. Coetzee is qualifying for the legal profession, and hopes to be admitted in due course. The Board of Executors, the management of which is practically in this gentleman's hands, was formed in 1890, and has had a prosperous career from its inception.

Mr. WILLIAM NICHOLAS GLAESER.

Mr. William Nicholas Glaeser, agent-at-law and sworn translator, who is a native of the Cape Colony, arrived in Marico district in 1883. He graduated at Pretoria, was admitted to the side bar in 1895, and began the practice of his profession at Zeerust in 1892. Being the senior practitioner he has a very extensive business, and enjoys the confidence of the residents of the surrounding country. Mr. Glaeser is secretary of the local branch of "Het Volk." He has taken considerable interest in agrienlture, and is himself a farmer on a large scale, having over 250 acres under cultivation. The results of his labours in this direction have proved eminently satisfactory. Mr. Glaeser is of opinion that farming on up-to-date lines will always pay handsomely in this region.

Mr. CHARLES P. MARAIS.

Mr. Charles P. Marais, who is by profession a law agent, is a native of the Cape Colony, and arrived in Ottoshoop in 1888. He represents Messrs. Marais Brothers, late of Kimberley, and the Malmani Gold Syndicate, Ltd., whose head offices are situated in London. Messrs. Marais Bros. and the Malmani Syndicate own each two farms in the locality. Mr. Marais is a J.P. for the Marico district. He has recently removed his practice to Zeerust.

Private Residence of Mr. T. G. Sephton, Zeerust.

Mr. THOMAS GIDDY SEPHTON.

Mr. Thomas Giddy Sephton, who was born in England, arrived in South Africa as long ago as 1853, and proceeded to the Marico district in 1864, at which time the township of Zeerust was still the farm "Azea," in possession of Mr. Caspar Coetzee. Upon certain conditions the latter gentleman obtained the Government's permission to convert his property into a township, and after this had been consummated the settlement was used by the hunters of the interior as their base. Mr. Sephton recollects seeing as much as 35,000 lbs. weight of ivory being brought into the township as the result of one expedition. He is a very large property holder in the district, and his opinion with reference to the value of land may be relied upon. He says that prices of both farms and building plots must materially increase in the near future, more particularly as the railway connecting the township with Krugersdorp is in course of construction. Mr. Sephton has travelled almost throughout the whole of South Africa, and his selection

Business Premises of Mr. L. P. Boyce, Zeerust.

of Zeerust as a place of residence was principally on account of its enormous agricultural possibilities. He is a prominent member of the Zeerust Municipal Council.

Dr. A. T. THURSTON.

Dr. A. T. Thurston, L.R.C.P., L.R.C.S. Ireland, and L.M. Rotunda Hospital, Dublin, studied at Trinity College, Dublin, and Queen's College, Cork. He proceeded to the West Coast of Africa in 1899, acting as Assistant Medical Officer to the Government Railway at Lagos. He joined the Yeomanry during the war in South Africa, on Lord Methuen's staff. He moved to Zeerust in 1901, and there commenced the practice of his profession, in which he has been engaged ever since. He was appointed medical officer to the Municipality, and is acting medical officer for the railway construction works. Dr. Thurston considers Marico to be particularly healthy, practically no cases of infectious disease having come under his notice.

Mr. L. P. BOYCE.

Mr. L. P. Boyce, who is a native of London, England, arrived in Zeerust in 1883, and having conceived a favourable impression as to the prospects of the district, he in 1892 opened a business at Vaalkop, establishing himself at Zeerust in 1900, as general storekeeper. In addition to the usual comprehensive stock, a speciality is made of agricultural and farming implements, Mr. Boyce acting as agent for Messrs. Malcomess & Co. A branch to which the firm has devoted particular attention is the local tobacco industry, of which Mr. Boyce has a great deal of expert knowledge, and he unhesitatingly states that the flavour of the tobacco produced there is fuller than that grown in other parts of the Transvaal. A very large proportion of the output is handled by this house; fully half the quantity of roll tobacco produced in 1905 went through their hands. Mr. Boyce may be termed the pioneer of this industry in this part of the Transvaal, for it is owing to his energy that the tobacco grown in Marico has found its way to all the South African markets. He states that its progress is much retarded by want of knowledge on the part of the farmers, but the Government has promised expert help, for which the growers are eagerly waiting. Mr. Boyce is chairman of the Chamber of Commerce, and chairman of the Marico Board of Executors and Trust Company.

Zoutpansberg.

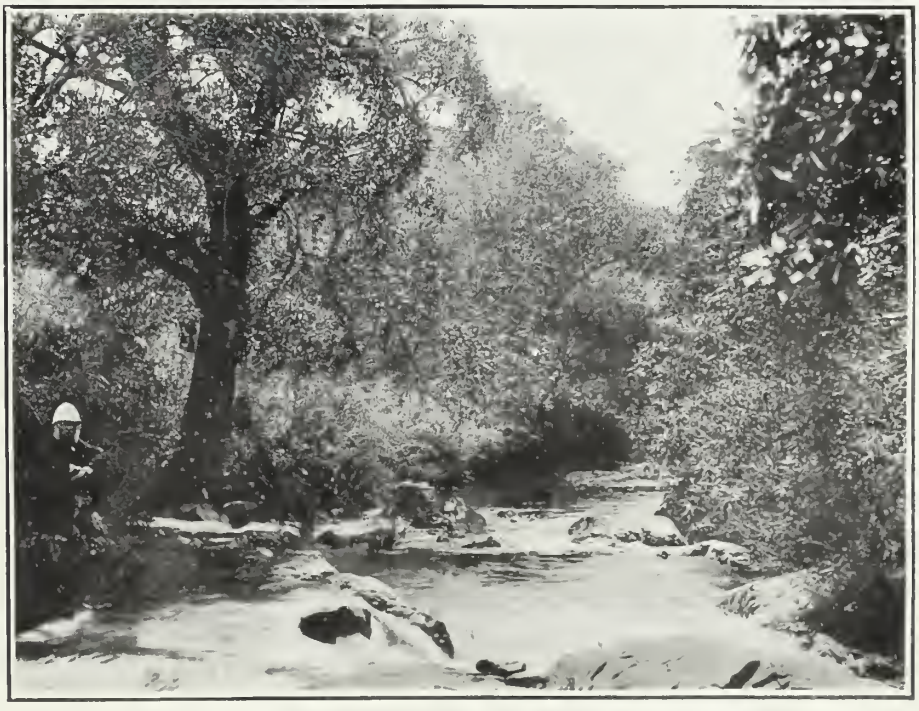
The Zoutpansberg district is the largest and most northerly of all the Transvaal divisions, embracing an area of 25,654 square miles, or about one-fifth of the entire land-surface of the Colony. It is nearly twice the size of any other district of the Transvaal, and includes High Veld and Low Veld, bracing and semi-tropical zones, and spots where almost anything can be successfully grown. Its northern boundary is the Limpopo River; to the west lies the Waterberg district; east, the territories controlled by the Portuguese Government; and south, the Olifants River, separating it from the Lydenburg and Middelburg districts. The principal towns in the division are Pietersburg, Leydsdorp, Haenertsburg, and Marabastad, and it includes within its boundaries the rich gold-bearing areas of the Spelonken, the Klein Letaba, the Murchison Range, the Selati River, and other goldfields of the Low Country. The Zoutpansberg is a typical mining country, but the formation is totally different from that of the Witwatersrand. Here the gold occurs in true fissure veins. Other minerals known to exist in payable quantities are silver, copper, iron, cinnabar, and galena. A ruby mine

Banket Reef formation, Zoutpansberg.

has been discovered to the north of the Sand River, lying about 40 miles from the town of Pietersburg. Specimens obtained there which were sent to England were favourably reported upon. Scientific irrigation is a subject for the serious consideration of agriculturists, as the development of many parts is retarded owing to the lack of water. Amongst several promising gold-mining properties closed down in 1895 was the Eerstelling Mine, owned by Messrs. Lewis & Marks. This is the oldest gold mine in the Transvaal, and was obtained as a concession from the Government of President Burgers. It lies 18 miles to the north-west of Pietersburg, and has an old-style plant with a stone chimney. Zoutpansberg has an extensive high veld, with a healthy climate; to the east, however, fever zones are frequent. The principal waterways are the Limpopo River to the north, with its tributaries the Levubu and the Ingalele, the latter having confluents the Vischwater, the Hout, and the Sand Rivers; and the Olifants River to the south, with its tributaries the Selati and the Groot and Klein Letaba Rivers. In spite of the existence of these streams, the water supply is deficient throughout the region. Mealies and kafircorn are largely produced, and attention is being paid to the cultivation of rice, sugar, coffee, tobacco, and cotton, for all of which products many parts are eminently suitable. The growing of coffee, sugar, and rice has been profitable, and fruits of almost every kind are largely produced, and with little difficulty. The scenery in the eastern parts of the Zoutpansberg is extremely beautiful, displaying great diversity of wood and water, mountain and low-lying plain. There are large tracts of bush veld. Much progress has been made in farming, and many new methods have been introduced. The farmers have had uphill work, and have suffered from commercial inflation and subsequent depression, also from the changed conditions of their lives—from hunters to agriculturists, so to speak. The opening up of the country by a railway is a pressing need, as the development of new industries cannot be placed on a permanent footing without means of conveying produce to market. At present, merchants at Pietersburg, the capital, find it more advantageous to bring produce by rail from Johannesburg and Natal than to purchase within the district. A great opening is anticipated for viticulture, an excellent quality of grape being produced in the Zoutpansberg; but the restrictions imposed by the Government, which confine distillation to the grower's personal needs, have been a drawback. The reason given for such restrictions is that there would be difficulty in maintaining proper control, and danger of "leakage" to natives; but, as similar difficulties have been met and overcome in Cape Colony, they should not be considered sufficient to prevent the development of the industry in Northern Transvaal.

Groot Letaba River, Low Country, Zoutpansberg.

Taking into consideration the many drawbacks with which the district, as a whole, has had to contend, it may with confidence be asserted that it has, notwithstanding, forged ahead satisfactorily during the past few years. Lack of expeditious means of transport is amongst the most serious of the obstacles which stand in the way of further development, and lead-



View in Spellonken, Zoutpansberg district.

ing inhabitants naturally enough urge an extension of the railway system. New blood is, however, coming in, and this fact augurs well for the future prosperity of this vast area. Cattle diseases have been, in the past, a perplexing and disastrous feature, but thanks to the untiring energy and determination of the Veterinary Department of the Government these have now lost many of their terrors. The worst of them—Rhodesian redwater—is being gradually eliminated, the ravages of piroplasmosis, or biliary fever, which has carried off so many donkeys, have already been checked, and the time is probably not far distant when this and other parts of South Africa will no longer be devastated by these and other stock diseases.

Monster Antheap, Zoutpansberg (17 ft. in height).

Zoutpansberg is probably better stocked with game than any other part of the Colony. All the antelopes commonly met with in the Transvaal, with the exception of the purely High Veld forms, are found here, and there are reported to be some buffalo in the district. Burchell's zebra are plentiful, and there are a number of hippopotami in the larger rivers. Giraffe are still to be found, and bush-pig and warthog are numerous. Lions, leopards, cheeta, hyænas, hunting dogs, jackals, and wild cats are of frequent occurrence. Wild ostriches are still numerous, and crocodiles abound in the rivers. Parts of the district are particularly rich in bird life. The Bushveld area consists principally of dense acacia thorns and mapani scrub, and contains some of the finest baobab trees ("cream-of-tartar tree" of the Boers) in the Transvaal. In the High Forests are many magnificent hardwood trees, such as South African mahogany, etc. The principal rivers in the district are the Limpopo, with its tributaries the Sand River, the Jelele, the Ngnanetsi, and the Livubu; the Brak River and 'Mtamba, tributaries respectively of the Sand and Jelele Rivers. The native population of Zoutpansberg is a large one; the principal tribes are Basuto, Makalanga, and Mashanga.

Pont on the Limpopo River

(boundary between Transvaal and Rhodesia), Zoutpansberg. (This affords the only means of crossing the river excepting over the "Drifts," which are only passable when the river is low.)

Mineralogy.—The following description deals with that portion of the Northern Transvaal lying south of the Zoutpansberg range to the Limpopo River; and from Brak River on the west to Portuguese boundary on the east:—Leaving Louis Trichard on the south, and crossing the hills on rough wagon roads and Kafir footpaths, the formation of the mountain range, extending from the saltpan on the west to the Portuguese boundary on the east, is found to be of sandstone quartzite and conglomerates. Some of the latter resemble those of the Rand. Gold has been found on several farms on the southern side, and also on the top, but this part of the country is not proclaimed, and not much prospecting has been done. Iron also is found, and has been worked by the Kafirs, and used for making picks (hoes) and axes. Lead, plumbago and saltpetre have also been located. On the northern side of the range coal measures occur, and prac-

tically run from the Brak River to the Portuguese boundary. The best coal in the Transvaal has been found occurring in extremely large seams on the Levubo River, near the Portuguese boundary. The coal shales are found along the line in various places, proving the existence of very large coal deposits. Hot springs occur in several places along the coal formation, one on the Jelele River being very large and extremely hot. Leaving the mountain on the south, where white settlement ceases, the country changes to gneiss, gneissic schists, and hornblend schists, with eruptive granites and diabasic rock, and the copper country commences. The first occurrence of copper is that of the 'Mtamba, the lodes occurring parallel with a strong dyke which parts the gneissic rocks from the shales and quartzites. Exploratory work has disclosed several very promising bodies some miles in extent, and from "stringers" to 12 ft. in width. The ores met with here are very varied—native copper, bornite chalcopyrite, glance, malachite azurite, and the red and black oxide. North from here to the Limpopo and north-east to the Portuguese boundary are cuperiferous, promising lodes carrying glance, malachite and azurite occurring in profusion, those on the Jelele River and in the vicinity of Blaauwkop showing up very strong and permanent-looking lodes. In the vicinity of the junction of the Sand or 'Mketzi River with the Limpopo, extensive deposits occur, hardly a mile being traversed without evidences of copper being seen. Numerous and large ancient workings exist in this vicinity, and judging from appearances these lodes have been worked simultaneously with those of Rhodesia and down to the present day (the Kaffir having worked them until about 20 years ago). The most notable mine hereabouts is the "Messina." Acres of old workings are here, and extensive opening up has already taken place, disclosing lenses of copper glance ranging from a small percentage up to 70 per cent. More development has been done here than on any other of the properties, and it was the first to be floated into a development company. These bodies are lenticular, and range up to 6 ft. high-grade ore. Gold has been located on the Sand River, the prospecting done so far showing a large body of pyritic ore. The prospectors of this anticipate a big thing. Large bodies of magnetic and hematite iron are met with in great profusion on both sides of the Sand River, and no doubt will be worked eventually. Iron has been worked by the ancients in various places, large workings existing near Cream-of-tartar-fontein. From Mesabi's Drift on the western line of the copper belt, and back on to the Brak River, and also on the Jelele River, extensive prospecting has been for a long time carried on for diamonds, but little success had been recorded when this was written. The garnets, etc., found (these always occur with diamonds) were mostly thought to have been weathered from the gneiss, bands of garnetite being seen in several localities in the gneiss. This district must very soon become one of the most important mining areas in the Transvaal. Copper, with its associate minerals, zinc, lead, silver, and gold occurs nearly all over it, coal being in close proximity and of known payability and quality. The only thing necessary to the development of the district's minerals is capital, and this is gradually being forced into it, by the approved richness of the deposits, some of which cover a stoping width assay of from 10 to 70 per cent. Dr. Voit, in his description of the area, calls the gneiss "the fundamental gneiss formation of South Africa."

THE MINING INDUSTRY

OF

THE TRANSVAAL.

The Mining Industry of the Transvaal.

Introductory Chapter.

THE mineral wealth of a country is in the last resort nothing but the capital, the equivalent of hard cash, available for its inhabitants. When the country's mineral resources are exhausted the people find that they have spent their capital—the money is gone beyond recall. Agricultural wealth, on the other hand, represents resources from which under normal conditions the people draw only an increment or interest, and of which it is usually difficult to dissipate the capital sum. The wise nation is, therefore, the one that uses its mineral wealth to secure from the other resources of its territory the fullest possible increment. Whatever lesson the infant South African nation may be learning, whatever use it may hereafter make of the teachings of its present bitter experiences, it may confidently be asserted that in the Transvaal at least folk have not reached out their hands towards wisdom, but have squandered rather wantonly the people's more easily available capital—the mineral resources—with any other object in view than the thrifty development of the increments accruing from its more stable resources, its less evanescent national assets. Truth compels one to admit that the older inhabitants of the Transvaal, the pioneer farmers, have from an early period been as guilty as the most short-sighted and greedy of the newcomers in this respect. Their policy—and that *fine fleur* of their policy, the Kruger ideal—almost from the first was to utilise the mineral wealth of the country not so much for the purpose of creating the largest number of happy homes, its only ultimate and legitimate function, as for much more short-sighted ends. On the contrary, subtly tempted by adventurers and insensibly betrayed by their dislike of suspicion of the newcomers, the old farming population has diverted the nation's wealth from its legitimate function of creating homes in order to create dividends. It is true that to them the sacred end of their policy was to create a defence for themselves against the newcomers, and to that end they devoted by far the greater portion of their own share of those dividends, but the actual effect of this course was to "play into the hands" of cosmopolitan finance, to mortgage the cream of their wealth to the foreign shareholder, and to set the foundations of the nation's progress on wrong lines. That this is not a distorted view of the old state of things a significant incident illustrates. The late President Kruger, in a moment of very unusual expansiveness, once said to a friend of the writer that nothing could prevent the Transvaal from becoming British territory, but he would see to it that when Great Britain did get his country, she would find she had seized only a "sucked orange." All this may be ancient history, and may seem scarcely pertinent to the subject in hand, but it is to history that we have to turn in order to secure a true perspective of things, and it is from the lessons of history that we have to draw inspiration for wisdom in the future.

Dealing with the present, there is no clear-headed and well-informed observer who has studied South African development and the conditions to-day of life in that country but must be convinced that the welfare of the Transvaal is inextricably bound up with its mineral resources. It is with the hope of giving an accurate, vivid, and well-balanced general view of those resources that the following account of them has been written. The ordinary reader, before perusing it, is asked to realise that any measure that is for the true benefit of the industrial population will react on the farming population, and that it is impossible to establish between them that artificial barrier which the coincidence of the race line has helped to build up. There are, indeed, special circumstances in the mining industry of the Transvaal which have given colour to this theory of the antagonism of interests, but they are due to a transient phase, and are not inherent in the situation.

These notes are appearing in the midst of a crusade against capital that is in great part sentimental and assuredly—perhaps unconsciously—hypocritical. During the earlier race to create dividends, financial methods have been employed without doubt of such a nature as to destroy in great measure the confidence of the large investing public in South African enterprises, but that is at least just as much the fault of the general community as of capital in not having made and enforced a stricter company law. Be that as it may, the result has been the cutting off from South Africa—and especially from the Transvaal—of the fertilising stream of money needed for newly-started and fresh ventures. This condition of affairs is reacting sharply on the people of the country, who have no experience at command to help them to guide their steps through the pitfalls that beset them. The most thoughtful and sober-minded see that the dangerous side of capitalism is that its representatives, who are aliens, or "birds of passage," wield inordinate power and are free from the corrective control of a wide and compelling public opinion.

The description of a country's resources, and particularly of a large organised industry like that of the Witwatersrand Goldfields, always tends to degenerate into a list of names and a mass of figures and tabulations—of great interest and value to the engineer, the commercial man, and the financier, but unattractive and unintelligible to the general reader. These notes set out to appeal more to the general reader, to the English-speaking man who takes some interest in the fortunes of the English-speaking races. Those who hope to find here details and

statistics are referred respectfully to the formidable array of already published works of that class. The blue-books of the various departments of the Transvaal Administration, the extremely comprehensive and broadly-conceived annual reports of the Transvaal Chamber of Mines, and of such bodies as the Johannesburg Chambers of Commerce and of Trade, the full and candid statements issued periodically by the big financial corporations and mining houses, such works as Skinner's "Mining Manual" and Mabson's "Mines of the Transvaal": all these, and a host of kindred publications, constitute a library for the specialist.

In the construction of the following notes dealing with the mining industry of the Transvaal many obstacles have been encountered: in a very large proportion of the factors affecting the mining industry the conditions that should exhibit some degree of finality are in a state of hopeless "flux"; socially and politically the community is in a condition of chaos, and in several of the essential questions vitally affecting the future of the industry the issues are sadly confused, owing to the lack of any defined policy for their treatment; and there are many controversial subjects that virtually cannot be touched upon if this book is to retain during the next few years any value as giving in correct perspective a general view of the Transvaal Colony and its resources.

P. A. O.

A Chronological List

OF SOME OF THE MORE IMPORTANT EVENTS CONNECTED WITH SOUTH AFRICAN GOLD-MINING (IN WHICH THE TRANSVAAL PLAYS SO PROMINENT A PART THAT THESE FACTS MAY BE SAID TO CONSTITUTE AN INTEGRAL PORTION OF THE COLONY'S HISTORY).

1868.—Carl Mauch mentioned the existence of gold near the Olifants River, in the Transvaal.

1870.—Gold was found in the Murchison Range. (NOTE.—Edward Button found gold in the Marabastad fields, Zoutpansberg district. Both in the Transvaal.

1873.—Gold was found in the Lydenburg district (Transvaal) near Pilgrim's Rest.

1882.—The De Kaap Goldfields were started in the Transvaal.

1884.—The brothers Struben commenced quartz-mining on the farm Weltevreden, north of the western section of the Witwatersrand Goldfields, and started a 5-stamp battery.

1885.—The value of the Sheba Mine (De Kaap Goldfields) was recognised, and the town of Barberton was founded.—Gold was panned from the conglomerates of the Witwatersrand formation.

1886. Johannesburg was founded.

1887.—The first stamp mill commenced regular crushing on a banket proposition. Coal was discovered at Boksburg. The Stock Exchange was opened in Johannesburg.

1889.—Formation of the Chamber of Mines. Collapse of the first outbreak of acute share speculation.

1890.—First working test of the cyanide process, and start of the cyanide treatment plant at the Robinson and the Sheba mines.

1891.—The chlorination process first began operations at the Robinson "customs" works.

1892.—Beginning of the "deep-level" era. Opening of the railway to the Transvaal *viâ* the Orange Free State.

1893.—Rand Victoria borehole: the Main Reef cut at 2,343 ft.

1894.—Direct treatment of tailings by cyanide process inaugurated.

1895.—Second period of acute share speculation. Bezuidenville borehole cut the Main Reef at 3,127 ft.

1896.—Extensive adaptation of cyanide process to treatment of slimes.

1897.—Industrial Commission of Inquiry sat in Johannesburg.

1899.—Main Reef exposed at 3,700 ft. in the Catlin Shaft.

1901.—Three mines re-started crushing (after the war); May. South Reef cut at 4,804 ft. in Turf Club borehole.

1904.—The first batch of Chinese unskilled indentured mine labourers arrived; June.

1906.—The re-commencement (in March) of a series of record monthly outputs of gold won in the Transvaal—the production attaining a rate equivalent to £26,000,000 sterling annually.

Mining Administration in the Transvaal.

IN order to understand the present system of Mining Law in the Transvaal, it is necessary to know something of its history. There has never been any question of the adoption of a scientific or consistent scheme, and the result has been the gradual growth of a somewhat complicated body of law, which has been freely amended from time to time, so as to meet the pressing needs of a rapidly-altering condition of affairs.

Although gold was reported by travellers to exist in the country many years ago, it was not until 1869 that Mr. Edward Button discovered gold in streams in the Lydenburg district. Two years later he, with Mr. Tom McLaghlin, claimed unsuccessfully the Government reward of £500 (which had been offered by President Burgers) for the discovery of the first payable goldfield in the Transvaal. The first "rush" of diggers took place in 1873. Up to that time there was no mining law, and no mining administration; the minerals belonged entirely to the owner of the land, but were not recognised as being of any particular value.

The success of alluvial gold-mining at Pilgrim's Rest, Lydenburg district, soon attracted a large body of diggers, and it speedily became apparent that mining legislation of some kind was essential. Generally speaking, the legislation at that period was local in character, as was also the administration of the law; in view, therefore, of the temporary character of alluvial mining, more attention was paid to the preservation of order than to questions of title. Although there were among them many Dutch from the Cape, and even Transvaal and Free State burghers, the diggers were for the most part in character and nationality quite alien to the settled inhabitants, for which reason they were naturally treated as a community apart, subject to special regulations. They were governed practically by a Diggers' Committee, and were regarded merely as sojourners in the land. This attitude has influenced all subsequent mining legislation in the Transvaal, and is the key to much that is perplexing and anomalous in the mining law of the present day.

To this period, however, belongs an all-important measure (Law 1 of 1883), which takes away the ownership of precious metals from the individual, vests it in the State, and provides merely for the assignment by the State of a certain share to the owner of the land, by way of compensation. All subsequent legislation has, apart from mere administrative provisions dictated by experience, been centred round these two main points—viz., the special relations between the State and a body of aliens, temporarily occupying a limited area for the purpose of working minerals; secondly, the adjustment of the proportion assigned by the State to the original owners of the land. There is reason to think that in the earlier days of the mining industry legislation was chiefly inspired by fear of the newcomers, and the desire to limit their number and to restrict their activity within narrow limits; it may even be that the assumption of all mineral rights by the State was effected with this object. For many years, however, this has no longer been the case, and the value of the minerals and of the new population has been recognised. The result has been that legislation has for some time been chiefly concerned with the relations between the claim-holder and prospector (as representing, and deriving title from, the Government) on the one hand, and on the other hand the landowner, who was once usually the Dutch farmer, but nowadays, so far as valuable mineralised areas are concerned, is usually (like the claim-holder) one of the newer population.

One result of the principle referred to as underlying mining legislation was that a Mining Department was gradually evolved which was called upon to deal not only with mining matters proper, but with all kinds of general administration. Thus, the local official responsible for the administration of each goldfield, termed the Mining Commissioner under the Boer Government, was charged with the widest magisterial functions. Besides administering justice, he collected revenue, carried on municipal work, and supervised natives, police, and public works. This organisation was no doubt suited to a primitive condition of society, but with the expansion of the mining industry, and the arrival of a large population on the goldfields, it became altogether unwieldly. In the course of time one after another of these functions had in practice to be delegated to special officials, but in theory the old organisation was retained to the last by the Boer Government. It was not until after the war that the Department of Mines was specifically relieved of all its extraneous duties. One notable anomaly under the old régime was the exclusion of the head of the Mining Department from the Cabinet, in spite of the enormous importance of the mining industry to the country. This has, of course, been remedied under the present administration.

At the present time, although Law No. 15 of 1898 (commonly known as "the Gold Law") is still in force, it has been so modified in effect by other ordinances that it no longer reflects at all accurately the actual method of administration. No doubt the enactment of a law better suited to the conditions of the time will be one of the first cares of a representative Legislative Assembly. In the meantime the mining industry of the Transvaal is carried on under the following laws, subject to the various regulations which have from time to time been enacted under them:—

Law 14 of 1897—Base Metal Law.
Law 15 of 1898—"The Gold Law."
Proclamation No. 34 of 1902—Profits Tax.
Proclamation No. 35 of 1902—Registration of Mining Rights.
Ordinance No. 6 of 1902—Registration of Mining Rights Amendment.
Ordinance No. 42 of 1903—Base Metal Law Amendment.
Ordinance No. 63 of 1903—Diamond Trade Law.
Ordinance No. 54 of 1903—Mines, Works, and Machinery Regulations.
Ordinance No. 50 of 1903—Mining Certificates of Competency.
Ordinance No. 6 of 1903—Registration of Mining Rights Amendment.
Ordinance No. 66 of 1903—Precious Stones.
Ordinance No. 11 of 1904—Registration of Prospecting Contracts.
Ordinance No. 17 of 1904—Labour Importation.
Ordinance No. 31 of 1905—Mines, Works, and Machinery Regulations Amendment.
Ordinance No. 35 of 1905—Trading (Mining Ground).

Ordinance No. 7 of 1905—Brick-making, lime-burning, and quarrying (Proclaimed Lands).
Ordinance No. 4 of 1905—Explosives.

Features of the Mining Laws.

Even to the man whose business lies within the mining industry of the Transvaal, the assimilation and practical grasp of this mass of legislation is a formidable matter, and to the ordinary layman, who wishes to understand something of the conditions governing the acquisition of mining property, the difficulties in the way of intelligent comprehension are well-nigh insurmountable. The opportunity is, therefore, here taken of giving a short outline of the main features of the Transvaal mining laws, sufficient to permit of those interested in mining matters, or desirous of investing in "claims" at first hand, realising the methods of procedure.

Gold and other Precious Metals.—The right of mining for, and disposing of, all precious metals belongs to the State. The owner of *private property* may prospect thereon without licence, and may permit another person to do so, on obtaining a licence from an official of the Mines Department, or from a Magistrate. Unless prospecting is done, or permitted, by the owner, the land cannot be thrown open as a public digging. When private ground is proved payable for mining to the satisfaction of the Government, and is to be thrown open as a public digging, the owner has the prior right to mark off for himself a mining lease (*mynpacht*) not exceeding in area one-tenth of the "proclaimed" ground, which mynpacht he thereafter holds, either at a small rental or on a royalty of 2½ per cent. of the gross income, at the option of the Government. He has the right to assign to his nominee a specified small number of concession (*vergunning*) claims, and also to reserve a homestead (*werf*) upon which he obtains exclusive mining rights. There is laid down no legal limit to this "werf" upon an occupied farm, but on an unoccupied farm it is defined as one-thirtieth of the whole area. Accordingly there is nothing to prevent the owner at the discretion of the Government from recovering in effect the whole of the balance of the farm as "werf," and from practically monopolising exceedingly valuable mineral rights. As, however, hardly any private land has been proclaimed since this provision was inserted into the law, or is likely to be proclaimed before a new Gold Law comes into force, it is impossible to give any idea of what area the owner would receive as "werf." On *unproclaimed Crown lands*, unless specially reserved, prospecting may be carried on by anyone in possession of a licence, but mining titles are granted only to "discoverers" who have secured from the Government formal recognition of their discovery. The area granted under the Gold Law as "discoverers' rights" consists of only six "reef" claims, each measuring 150 Cape feet in the direction of the strike of the lode and 400 Cape feet in the direction of its dip.

Upon "proclamation" of any ground (private or Crown lands) as a public digging, any adult person may, after taking out "prospecting" licences from the District Registrar of Mining Rights, peg out any number of claims not exceeding 50. If "reef" claims, each measures 150 by 400 Cape feet (as above); if "alluvial" claims, the size of each is 150 by 150 Cape feet. (In Cape measurement 100 feet are equivalent to 103·3 English feet.) The underground boundary of a claim is in a plumbline with the surface boundary. On private land the "prospecting" licence has to be renewed monthly at a cost of 5s., half going to the State and half to the owner, on Crown lands at a cost of 2s. 6d. The licence-holder is also entitled to peg 50 "digger's" claims of the same size, but as the licence fee is 15s. this is in practice never done. The cheaper course is adopted by securing the use of a friend's name, under power of attorney, for each block of 50 "prospecting" licences that it may be desired to peg off. The law evidently intended to limit the number of claims to be acquired by any individual, but it is quite ineffective in this respect, and in practice the number of claims which can be pegged is limited only by the extent of the ground and the activity of the peggers.

After duly pegging the ground, the claim-holder has to hand in a sketch plan of his claims and get his pegs verified by the Beacon Inspector, which official issues to him a certificate of inspection and assigns an official number by which his claim is thereafter designated. The Beacon Inspector has to see that the claims are actually on proclaimed ground, and that they do not overlap anyone else's holding. He is frequently called upon to adjust disputes between rival peggers. Within two months after pegging, the claim-holder has to have his claims properly surveyed by a qualified Government surveyor, and to file diagrams with the Mines Department. These diagrams are carefully checked and verified by the Department and by the Surveyor-General, and—upon being certified to by the latter official—the title is complete. All that is necessary afterwards is the regular payment of licences. In default of payment of the licences the claim immediately lapses to the Government, and cannot be re-pegged by any other person until after the claim has been put up to public auction. If not then sold, the ground is declared open for pegging 30 days after the date of such auction. The law requires all lapsed claims to be put up for sale three months after the licence moneys fall into arrear, but the claim-holder may demand a fresh licence by payment of arrears together with a fine of 25 per cent. before the sale of the claim takes place. Provision is made for exemption from liability for licences in the case of persons called upon for military service, or in unhealthy districts. There is no provision for the compulsory working of claims, but the District Registrar of Mining Rights may, in default of work being done, order the claim-holder to pay 20s. or 15s. per month instead of 5s. or 2s. 6d. In practice, however, this is scarcely ever done.

When "alluvial" mining is possible, every licensed digger may peg three alluvial claims in addition to his reef claims, for which, however, licences have to be taken out at a cost of 20s. each per month. For these claims no surveyor's diagram is required. When both "reef" and "alluvial" are found on the same claim, the licence-holder has for three months the prior right to complete his title and cover his ground by taking out the additional reef or alluvial licences, as the case may be. These provisions for alluvial claims are at present virtually a dead letter, since alluvial mining, as contemplated when they were made, is practically non-existent. Wherever alluvial mining is now being done it is carried out under another form of title—viz., an alluvial "mynpacht." This may at the discretion of the Commissioner of Mines be granted where it appears that alluvial ground is not sufficiently rich to pay under the above-mentioned conditions. These alluvial mining leases, in extent 500 by 500 yards, are granted for fixed periods, generally one or two years, at a rent of 10s. per morgen or at a royalty of 2½ per cent. of the gross yield. Usually the performance of a certain amount of work is made a condition of renewal.

The payment of wages in rough metal or uncut precious stones is forbidden, as is also payment in anything but coin of legal tender—thus preventing the "truck" system.

There was introduced in 1902 a tax of 10 per cent, on the net product of mines worked under the Gold Law. This is known as the Profits Tax.

It is important to note that the possession of a mining claim of any kind does not confer the right to dispose of the surface, except for working the claim, which right belongs to the State. It was therefore necessary to make provision for the dwelling accommodation of the mining population, and this was done by instituting building lots ("stands"). Every licensed digger has the right to a stand upon his own claim for a dwelling, but not for trading or other purposes, for which sites may be obtained upon proclaimed ground that is not held under a mining title. The law provides that these stands could be 50 by 50 Cape feet at a monthly licence of 7s. 6d., or 50 by 100 Cape feet for 11s. 3d., or 100 by 100 Cape feet for 15s., and larger at a proportionate price, at the discretion of the Mining Commissioner. In all the large mining centres, however, the stands were originally surveyed of the absurdly inadequate size of 50 by 50 feet, but under the present régime, and under sanitary and social conditions varying so essentially from those of the "mining camp" contemplated in the pioneer days, stands of this size are seldom, if ever, granted. In the case of private land, half the licence money goes to the landowner. For general purposes, sites within proclaimed areas are laid out as townships by Government, or by the landowners with consent of the Government, and the lots in these "stand townships" are sold at public auction. The title, similar to that of a claim, depends upon the payment of licence, but the term is for 99 years, or until the de-proclamation of the diggings; in the latter case no compensation is paid. The title is, however, in reality perfectly secure, as no Government would be likely wantonly to de-proclaim ground on which were situated stands of great value, as for instance at the big mining centres. It has been found of late that, where (as on the Rand) there are large and continuous claims areas and a considerable population, further provision is needed for trading within mining areas; so the law has been modified, and the grant of stands on claims is now permitted under certain circumstances.

Base Metals and Coal.—Up to comparatively recent times but little attention was paid in the Transvaal to the mining of base metals and coal. The first legislation on the subject dates only from 1895, and was superseded by Law 14 of 1897. In contrast to precious metals, the ownership of and right of dealing with base metals—a term including all minerals for which no special legislative provision has been made—is vested in the landowner. The main features of the present Ordinance are:—

Persons working on private ground, whether proclaimed or not, pay to the State a royalty of 1 per cent. of the gross value of minerals won, if the total production exceeds 200 tons per annum. On Crown lands proclaimed as public diggings any person may obtain licences for 12 claims, each 150 feet by 400 feet in extent, on payment of 10s. per block of 12 claims for the first year, and 5s. per month subsequently. Claims may not, on Crown lands, be pegged on ground already held under licence for precious metals or precious stones, while persons holding licences for the latter may prospect and mine for base metals on their claims without further licence.

Discoverers of base metals on Crown lands, whether proclaimed or not, the discovery of which is officially recognised, may obtain a lease from the Crown to work the minerals upon terms to be arranged. The practice is to insist upon the ground being actually developed, and to grant an area sufficient in each case to do this upon a commercial scale. In general the administrative provisions and regulations regarding base metal claims are identical with those for gold claims.

Precious Stones.—Mining for precious stones is of most recent date in the Transvaal, and until 1898 there were no special laws dealing with the subject, the provisions of the Gold Law being nominally applicable to precious stones. Upon the discovery of diamonds near Pretoria, however, it became evident that special provisions were urgently required. The Gold Law had already declared the ownership of precious stones to be vested in the State, and this has been re-affirmed in all subsequent legislation. A peculiar feature of the first Diamond Law was the manner in which the State disposed of its rights. The Government of the South African Republic always suffered from a fear of rioting in connection with mines, and seems to have been greatly preoccupied with the endeavour to prevent any "rush" upon the discovery or throwing open of new fields, such as occurred in former days at Kimberley. The method the Government adopted to prevent this was, after providing for the landowner and the discoverer, to mark out the mine into claims and dispose of them by public lottery. Shortly before the war provisions for this purpose were introduced into both the Gold Law and the Diamond Mining Law, but were never actually carried into effect. In 1903 the Law was completely revised, and an equally novel method of disposing of the rights of the Crown was adopted.

The principal provisions of the Precious Stones Ordinance are as follows:—

On Crown lands any person may, by taking out a licence costing 2s. 6d. monthly, obtain the right to peg out for his exclusive benefit a "prospecting area" one thousand yards square. On private lands the owner or his agent may prospect without a licence, upon notifying the District Registrar of Mining Rights of his intention so to do. On discovering a mine, the prospector on Crown lands is entitled to an undivided one-tenth share of it, the remainder going to the Crown—excepting where the mine is very small, in which case the prospector gets a larger proportion. The owner of private land is entitled in a similar way to an undivided four-tenths share, the remainder going to the Crown. The novel principle introduced into Ordinance 66 of 1903 is that, instead of disposing of its shares by lottery, the Crown retains its ownership. This is frequently described, but erroneously, as the Crown entering into partnership with the owner, or discoverer, but the Government risks no capital and incurs no liability, as must be the case in a partnership. The landowner has the prior right of working the mine as a whole, and of providing the capital, and he must declare his intentions within three months. Should he elect to work the mine, the first profits are set aside to repay the working capital provided, together with 10 per cent. interest, and after this is done the Crown shares in the profits to the extent of six-tenths, the owner retaining four-tenths as his share. Provision is made for the *bonâ fide* working of the mine, and for settlement of disputes between the Crown and the owner. If the owner refuses or fails to work the mine, the Crown may call for tenders. In that case any eventual profits are divided between the Crown and the owner in proportion

to their holdings. If no satisfactory tender is received, the mine may be leased to the owner on terms to be agreed upon. If the Crown, on discovery of precious stones, considers it advisable to proclaim a "mine," the area proclaimed thereupon comes under various administrative provisions framed for the purpose; but even if no "mine" is proclaimed, the owner or discoverer respectively is entitled to mine for his own benefit a proportion of the diamondiferous area equivalent to their interest, as above defined. The recognised discoverer of alluvial precious stones may obtain a reward of 50 claims (each 150 feet by 150 feet) free of licence money while held in his own right. In addition to this, the owner of any private land where an alluvial deposit of precious stones has been discovered is entitled to select next after the discoverer an area of 100 claims, or three-tenths of the area proclaimed, whichever is the greater. He is also entitled to receive one-half of the licence moneys, the amount of which is 20s. per claim monthly. After the discoverer and the owner have taken their share, the general public may take out licences as above for one claim for each person, or in certain cases the Crown may elect to sell such claims, or to dispose of them otherwise. Provision is made for the time-honoured institution of a "Diggers' Committee" in alluvial diggings, for the framing of regulations, local or general, also for the necessary compounds for native labourers and for the proper treatment of the latter, and for the proclamation of townships, and the selling of stands, in a manner similar to that adopted under the Gold Law.

Department of Mines.

IN a country such as the Transvaal, where a very large proportion of the whole population is connected, directly or indirectly, with the mining industry, it becomes inevitable that the Mines Department should rank as one of the most important branches of the Civil Service. It is of interest to note that, in contrast with the state of affairs obtaining under the old Transvaal régime (when the representative of the mining industry had no part in the Executive Council), in all the British self-governing Colonies where mining ranks as an important industry—from Western Australia, New South Wales, Queensland, and New Zealand, to Colonies like Quebec and Nova Scotia, where the mining industry is of small importance—there is a Minister in the Cabinet who is directly responsible to the Government for the mining industry. In Tasmania, where also the industry is of comparatively little import, the Minister of Mines is likewise Minister of Lands and Works; in Nova Scotia he is also Minister of Public Works; in South Australia he is Minister of Mines and Lands; but in a territory like Western Australia, with a gold output of about 9½ millions sterling, and in British Columbia, with an output of gold reaching to a value of 4 millions sterling, he holds no other position save that of Minister of Mines. In forming the Department of Mines in the Transvaal Colony, Lord Milner realised that a responsible chief was requisite for dealing with this huge industry—a Minister who would be directly responsible to the head of the Government, and should be as closely as possible in touch with the industry, with the Government, and with the general public. In order to secure at least two of these objects it was very desirable that this Minister of Mines should be "on the spot" in Johannesburg, in close vicinity to the mines, and in direct communication with the most important centres of his administrative department. By adopting this procedure it was resolved to do away with two of the reproaches that had been levelled against the old Government—one of which was the lack of centralisation, and therefore of control, and another that the Minister of Mines was difficult of access, and was not conversant with the requirements and conditions of the industry. With the gold and diamond output alone of the Transvaal mounting steadily to some 24 millions sterling annually, the policy which constitutes the Commissioner of Mines an executive member of the Government is being fully vindicated. Under responsible Government that official will doubtless be termed "Minister of Mines." The Transvaal administration is the only one in South Africa in which the mining industry is represented directly in the Cabinet or Executive Council; and, although proposals have been made to split up the Department, and to divide its functions amongst the other branches of the Civil Service, they have not met with public approval, and have been abandoned as soon as put forth.

The Mines Department, with its headquarters in Johannesburg, is presided over by a Commissioner of Mines, assisted by a permanent secretary and clerical staff. The occupant of the controlling position in the Department at the time of writing was the Government Mining Engineer, as Acting Commissioner of Mines. The selection of this Minister will be difficult to make, involving, as the duties do, a firm grasp of many intricate problems extending over a wide field, and a masterly comprehension of unique local conditions. In addition to the secretarial branch, there are three main branches—that of the Government Mining Engineer, including the department of the Inspector of Explosives; that of the Registrar of Mining Rights; and that of the Geological Survey.

The secretarial branch is charged with the general supervision of the whole Department, the keeping of records, the control of expenditure, and especially with the maintenance of continuity in its administration; it deals with all matters relating to the *personnel*, such as appointments, promotion, leave, and so forth, and with correspondence with other Government departments; it carries on the accounting of the Department, and the preparation of estimates, and prepares

legislation and other matters for discussion in the Legislative Council, and all matters for submission to the Cabinet.

The Government Mining Engineer's branch is responsible for the supervision and control of all mining operations of whatever nature, and of all boilers and machinery throughout the Colony. Its principal duties are:— The inspection and supervision of mines and other works and of all machinery; the examination of and issue of certificates to mine managers, overseers, mine surveyors, engine-drivers, and the like; the supervision of the manufacture and use of explosives; the valuation of mineral areas, and determination of the "lives" of mines for the Profits Tax; the collection and publication of mining statistics; the investigation into applications for discoverers' rights; the conduct of tests of machinery and of explosives for the public; the administration of the various ordinances and regulations connected with mining, and of the Public Roads Ordinance; the establishment of bench marks in mining districts, and the supply of survey data to mines.

The Government Mining Engineer's Department is administered from the head office in Johannesburg by the Government Mining Engineer, assisted by the Chief Inspector of Machinery, the Chief Inspector of Explosives, the Government Mine Surveyor, and their respective staffs. Under this branch the Colony is divided for administrative purposes into the mining districts of Johannesburg, Germiston, Krugersdorp, and Pretoria, in each of which an Inspector of Mines is stationed, with assistants and deputies, and inspectors of machinery, according to current requirements. The Inspectors, responsible direct to the Government Mining Engineer, see that the various regulations for safety, etc., are carried out in their districts; they investigate and report upon all mining accidents, and keep the Government informed of the general development of the mining industry. The Inspectors of Machinery inspect, test, and license all steam boilers, for whatever purposes used. The statistics collected by the Government Mining Engineer's office are published, some monthly, but the more elaborate half-yearly, or yearly. The tabulations are amongst the most complete and the best in the world, and have been contrasted very favourably with the statistical returns in Great Britain for which the late Sir H. de Neve Foster, H.M. Chief Inspector of Mines, was responsible. During the last official year nearly 11,000 separate returns were tabulated, comprising statistics of the capital invested in mines and works, labour employed, and the wages paid, output and value of minerals and analysis of the costs of working them, quantity and value of machinery in use, etc. The high standard attained in these returns has been rendered possible only by investing the Government Mining Engineer with legal power to insist upon proper returns, which almost invariably are willingly and accurately rendered by the mine-owners. Needless to add, the value of accurate statistics to so important and rapidly developing an industry, and to the whole Colony, is incalculable, and fully justifies the trouble and expense incurred in their compilation. No person may undertake the duties of mine manager, overseer, or engine-driver unless he is possessed of a certificate of competency—and by no means the least important of the duties of this office is connected with the issue of such certificates. For the purpose of granting them to those specified, as well as to mine surveyors, periodical examinations are held (orally, as a rule) in general mining and scientific subjects and in mining law (both general and that of the Transvaal). The Board of Examiners consists of an Inspector of Mines, an Inspector of Machinery, and of certificated mine managers.

The Registrar of Mining Rights branch is charged with the registration, transfer, and general administration of all rights held under the mining laws of the Colony. Under the old administration, consistent in its general attitude towards the mining industry, the registration of mining rights was entrusted to district officials, although in the case of titles to land it was early recognised that a central record office was essential. There resulted a serious lack of uniformity in practice, and, while in some districts the work was well done and the titles and documents were in good order, generally there was much left to be desired. Under the present administration, whilst all administrative work (except transfer of rights and all provisional grants of title) is carried out by district officials, the final grant of title is made by the Registrar of Mining Rights in the central office in Johannesburg. There the authoritative records are kept, the various districts having only copies for public information. In every other respect the public convenience is studied by the fullest possible decentralisation of administration, the limited centralisation thus secured ensuring that matters of vital importance are dealt with by thoroughly informed specialists who could not with due regard to economy be provided for each separate district. At the commencement of the period of British administration in the Transvaal it was found necessary, so that uniformity be introduced and all titles put thoroughly in order, to adopt temporarily a much greater degree of centralisation than will ultimately be called for, or indeed than to-day exists. Though the present system was at first misunderstood by the public, it has proved itself both advantageous and convenient. The Registrar, in addition to exercising general control over the district offices, is responsible for the keeping of licence and revenue registers, the checking and recording of surveyors' diagrams of mining rights, the compiling of maps and plans for administrative purposes and for the information of the public, the passing of transfer (mainly of township property), and the keeping of all records of title-mining townships being dealt with by a separate branch. Owing to the fact that very large areas of mining ground in the Colony are held without being worked, thus requiring the administration of the title department but not of the mine inspectors, the divisions of the Transvaal for registration purposes are not the same as those for mine inspection—the latter being liable to fluctuation in sympathy with the ebb and flow of industrial activity; while, to ensure continuity, the former cannot easily be altered. These registration divisions, ten in number, are:— Johannesburg, Barberton, Pietersburg, Klerksdorp, Pretoria, Boksburg, Krugersdorp, Heidelberg, Pilgrim's Rest, and Ottoshoop. Seven districts are administered by District Registrars, two by Assistant District Registrars, and Pretoria is temporarily included in Johannesburg. The District Registrars are assisted by 20 Beacon Inspectors and by a suitable clerical staff. An officer from headquarters inspects periodically. The duties of the District Registrars and their staffs are to issue licences to prospectors and diggers, to collect mining revenue, to inspect claims and beacons, to see that the obligations of claim-holders are duly carried out, and generally to represent the Department in their district. In times of any pegging "rush" they are often called upon to settle disputes of all kinds. The number of disputes settled solely by their personal influence and prestige—to the mutual satisfaction of the parties concerned—is a striking testimony to their tact and usefulness as a body, much litigation having been thereby avoided.

The Geological Survey branch of the Department of Mines supplies a deep-seated need in a young country where minerals play so important a part. This was recognised by the former Government of the Transvaal, in so far as it authorised a small expenditure for the service. Seriously hampered as was Dr. G. A. F. Molengraaff, then Director of the Survey, by continual lack of funds and by an inadequate staff, he performed work of notable value, which will keep green his memory in the annals of South African geology. Under the new administration the survey has been placed upon a more adequate footing. The staff consists of a Director and three Field Geologists, a curator of the museum, with an assistant, and a clerical staff. The office and museum are in Pretoria. The work accomplished by the Transvaal Geological Survey is universally recognised as reaching a very high level. Recently some criticism was directed against it, in respect of the energies of the staff being rather markedly withheld from the Witwatersrand area, and being too exclusively directed to the perhaps more academic aspects of the country's geological problems. The real fact is that the central Witwatersrand area had been omitted from the field of activity because so much work of this nature had been done by others—the large mining firms and individual experts having much bigger funds to draw upon, and better means at their disposal, than the Survey could possibly have. On this account the energies of this branch of the Mines Department have been in preference devoted to the study of the central Pretoria district, which—in addition to being accessible and most convenient—is of first-rate geological importance as furnishing a key to some of the more prominent problems, as well as to the economically important diamondiferous area, and as joining up with the coal district of Middelburg and the base metal area of the Bushveld. The Survey has already accomplished the chief features of these labours, and is now devoting itself to completing the central portion of the Transvaal, eastward, northward, and westward from Pretoria. By the end of 1906 it was intended that the Pretoria sheet of the Survey's geological map would be completed, as also the Middelburg sheet to the east, the Pienaars River sheet to the north, and a portion of the Rustenburg sheet to the west (in which district there are some very important problems). As each sheet covers an area of 2,120 square miles, this programme means the careful survey and delineation of some 5,500 square miles—a task which will be recognised by those acquainted with the nature of the duties as exceedingly creditable. In the meantime two very important matters in the Eastern Transvaal are being dealt with—viz., the Komati Poort coal area (about which very little was known), and the gold area which is generally known as the Lydenburg Goldfields. The two half-sheets representing these labours were expected to be completed at the end of 1906, and would call for very little more work to join up with the maps of the more central region. As soon as the Middelburg sheet is joined up with the work done northwards from Machadodorp, the labours of the Survey will be directed southwards into the Bethal and Ermelo districts, whence traverses will be carried for the purpose of connecting up with the known geological horizons —now the object of careful study. It is proposed to extend the Rustenburg work westwards to the geologically important district of Ottoshoop. In the northern region of the Transvaal, the Pietersburg district is soon to receive attention, Haenertsburg being chosen as a starting point, with the intention of working ultimately into the gold-bearing belts of schistose formation in the Low Country.

In addition to the ordinary work of the Survey, the services of the staff have been largely utilised by other Government departments, and by public bodies. The Director of Irrigation and Water Supply has secured a report (involving the geological survey of a considerable area of the Springbok Flats) upon the probability of obtaining a deep-seated water supply in that remarkably fertile region; the Barberton Municipal Council has received occasional advice with regard to obtaining an increased water supply for the town; expert evidence was given in the Rand Water Board arbitration, and before the Irrigation Commission.

It is quite likely that with the establishment of Responsible Government which may be expected in the Transvaal before long, the Executive of such administration will desire to proceed with this and other important work at even greater speed than was possible with the small staff the Survey had at the time this was written. Much of the country in the outlying districts is so very rough and difficult to traverse that a large staff will be required to attack the work with reasonable rapidity.

Substantial faults to be found with the oldest of the Transvaal mining laws are remarkably few. For many years it worked very satisfactorily, and under it there was considerably less litigation with respect to mining matters than is usual in mining communities generally. Such is the opinion of mining experts of professional experience gained in every portion of the globe where valuable mining knowledge was to be acquired.

The foregoing sketch sufficiently delineates the procedure by which mining property is acquired at first hand under the conditions upon which the existing Gold Law is permitted to work; but in some directions that Law is reduced to a dead letter, and in others specific amendments—in certain instances contentious, some of a purely administrative character—will assuredly be made as soon as a representative Legislature comes into existence.

One of the oldest principles of the Law—which has survived to the present time—is the provision for "proclaiming" mineralised areas, thereby formally setting them aside for exploitation and throwing them open to the public for the pegging out of claims. "Proclamation" resulted —and still results—in bringing into force certain laws and methods of administration which do not apply to the remainder of the country. By such abnormal process the Commissioner of Mines is empowered to grant to the individual or to the collective digger important rights to carry aqueducts, aërial tramways, pipe-lines, power-lines, and railways—in fact, to authorise any or all things needful for successfully carrying on the diggings, whether such works are erected on the applicant's own ground, or on claims held by other persons. It is this feature of the Gold Law (to which "proclamation" is specially confined) that has so notably freed the huge mining industry of the Transvaal from every kind of litigation. Its omission from the base metals and Diamond Laws has already given rise to grave difficulties. For instance, the tin mines of the Pretoria Bushveld are some seven miles distant from an aqueduct water supply, in consequence of which the proprietary have been forced to enter into a separate contract with each farmer over whose land the pipe-line has to cross. In practice it is found that amongst the number of farmers dealt with by a mining company many are reasonable in their conception of what compensation should be paid, but there are others who threaten to "hang up" the whole scheme by demands so exorbitant as

practically to constitute blackmail. In the case of the Premier Diamond Mines this was so apparent as to force an appeal to the Legislative Council, which after considering the appeal passed a private ordinance empowering the Company to pump flood water from the Wilge River, and also to lay down a pipe-line across certain farms on payment of an amount of compensation to be determined by arbitration.

When mineralised areas, known to be of very considerable value and situated within easy travelling distance of any of the large mining centres, were declared by the old Government open for pegging, public interest was directed to them in a very marked degree. Where such areas were of very limited extent, and it was beyond doubt that claims would command a high figure, a serious "rush" of those anxious to secure rights on the day of proclamation would take place. Frequently large sums of money and careful organisation were utilised in perfecting in advance a "plan of campaign," and gangs of men (often ruffians, and sometimes mounted and armed) would be employed and drilled for the work whilst camped beforehand on the ground to be thrown open for pegging. Naturally on these occasions there was grave risk of the crowd getting entirely beyond control of the officials and police, and more than once this led to such lawlessness that the authorities had to find a remedy. As a preventive step the Government caused the ground to be surveyed into claims, and provision was made in the law for giving these out by lot. The present administration has decided that the policy of giving out claims through lotteries is undesirable, and has initiated the principle of selling by auction. This novel feature in Transvaal mining administration was a recommendation of a Select Committee which was appointed by the nominated Legislature in 1901, and was subsequently embodied in 1903 by the Legislative Council in the Draft Gold Law—a measure which has been "hung up" for consideration by the properly-elected representatives of the people under a Responsible Government. This constitutes so important a departure from ordinary mining practice as to call for detailed mention. The proposed enactment provides that, when in the opinion of the Lieutenant-Governor it is considered desirable in the public interest, any land proclaimed as a public digging shall (after owner and discoverer have selected their rights) be surveyed into claim areas of not more than 100 claims; that the right to prospect and mine in such an area may, after three weeks' proper publication, be sold by public auction, and that the purchase price shall on sale be secured by two sureties, and be paid within one week. The Lieutenant-Governor may, however, authorise the sale of any *odd* pieces of open ground to the adjoining claim-holder.

mong the non-contentious alterations in the Gold Law that have been suggested and that have received the approval of the Mines Department officials are :—

The Grant of Provisional Water-rights to Prospectors.—Under the present conditions, should a prospector neglect (owing to the expense involved) to take out a formal water-right, it is open to any person (possibly with more money, but with less inclination to work) to secure the water "over his head" and to "freeze him out."

Subsidies to Prospectors.—The conservative (not to say unsympathetic) spirit in regard to the development of the mineral wealth of the country, which is the underlying principle of the mining laws initiated by the late Government, is entirely alien to the present administration, and has never inspired the Governments of such other British Colonies as are in possession of extensive mineralised areas. During the past administrative year (1905) a revenue of over £380,000 was collected by the Mines Department throughout the country, and it is officially stated that these figures considerably understate the actual mining revenue which finds its way into the Treasury. As it has been customary for the Government of the Transvaal to leave the development of the mineral resources of the country almost entirely to the unaided enterprise of private individuals, but little of this money has at any time been put back into the districts from which it was collected. From the districts of Pietersburg, Barberton, and Klerksdorp, amounts totalling nearly £115,000 have been collected; the Leydsdorp goldfield, which has never been properly opened up, for many years produced some £15,000 per annum. The great flow of capital which has been directed to the mining companies of the Witwatersrand, and the enormous importance which this great mining centre has assumed, added to the fact that the public—without any special facilities from the Government—has furnished the capital necessary for the development and equipment of these large undertakings, has in a great measure helped to overshadow and throw out of perspective the mining propositions of other and more remote districts of the Transvaal. By the opening up of the outlying districts of the Colony, sufficient work could (*provided an adequate supply of unskilled labour were assured*) be created for the employment of a large white population: the mineral resources of the country now lying unproductive would be tapped, and the general prosperity of the agricultural and commercial industries of the districts (now dormant) would be promoted. It would appear that in the near future the consideration is most desirable of some scheme whereby advances could be made to such small mining propositions as could be very profitably worked if suitably equipped, or for opening up the more highly-mineralised areas by the construction of railways or roads to facilitate the transport of the machinery and stores necessary for the work. In certain districts efforts must be made to obviate the lack of water in the vicinity of the main roads. At present such burdens fall entirely upon the prospector, who at times has either to abandon his venture and his claims, or to face a relatively large outlay in bringing machinery and stores to his mine over a difficult country. The following are the principal heads under which advances might advantageously be made :—

(1) Advances to mining companies to help them to test their properties at depth by boring.

(2) Advances to small battery owners to enable them to purchase and erect machinery.

(3) Subsidies in connection with schemes for the "sluicing" for alluvial.

(4) Advances to miners to assist them in deepening their shafts.

(5) Purchase and erection of State "central" batteries or "custom-mills."

(6) Subsidies to crushing plants for each ten tons crushed for the public, to enable battery owners to lower their crushing rates to the public.

(7) The pumping of waterlogged alluvial deposits that are too "bouldery" for dredging, so as to enable mining to be carried on.

All the above expenditure would be controlled by the State Mining Engineer. Should the export of base metals

or minerals become a permanent fact, it would have a very important effect upon the extension of the railway system, the traffic receipts would be very materially increased, new agricultural districts would be opened up, and local centres of consumption would be created for the benefit of the farmers.

More Liberal Awards to Discoverers.—The present procedure imposed upon the prospector who discovers payable base metals or minerals on unproclaimed Crown lands is cumbersome, recommends itself neither to the prospector, the public, or the Government, and is not calculated to encourage that rapid opening up of the mineral wealth so essential for the general advancement and welfare of the country. Discoverers complain that instead of being able to take out licences and peg any ground on which they have satisfied themselves there is a payable "prospect," they have to incur expense and waste of time—often a substantial consideration—in journeying to the nearest District Registrar's office in order to file their application, and to wait until a Commission is proposed to consider their claim before substantiating it; which time and money thus wasted could be profitably expended in opening up their discovery. Further, on substantiating a "discovery" and obtaining a certificate, the prospector is not entitled to any definite reward. The decision, therefore, of the Government to "proclaim" the whole of the northern (Zoutpansberg) fields, some 400 square miles in extent, has caused much satisfaction, the prospector being thereby enabled to secure his rights by the simple process of "pegging," as contrasted with the cumbrous method alluded to.

Amongst the more contentious alterations seriously put forward for incorporation into the new Gold Law are some that merit attention, as much on the account of the weight of expert opinion in their favour as from the support that will be accorded them by the huge financial interests so firmly established within the Transvaal mining industry. The "key-note" of this argument is that the landowner should be encouraged by every possible means to facilitate mining enterprise, and not discouraged. One of the chief attractions that is to be held out is the abandonment to the owner of the mineral rights over a larger portion than at present (and, in the case of the very deep mines, over the greater part) of his own property. The deeper the ore-body, the more expenditure has to be incurred in prospecting it, and the larger the outlay necessary in development. A "sliding-scale" has been suggested, therefore, by which a proportionately smaller or larger claim area (according to depth) should accrue to the owner of the land. The meagre unproportioned balance of claims, that under the present law is theoretically open for pegging by the public, is to be placed entirely out of the reach of the individual mining man—for would it not be unsafe to allow open pegging, and is it not in the best interests of the State, and of the big financial groups, that the ground should be opened up and developed to the producing stage as quickly as possible? Of what real use to the individual mining man would be the possession of a deep-level area too limited to work, which might be locked up indefinitely if surrounding claim-owners failed to agree to a common working plan? Consequently it is urged that the State should sell such mining ground for the best price obtainable, and should help the big mining firms to raise money for prospecting the ore-bodies by means of boreholes. It is further urged that both the lucky landowner, with his huge mynpacht, werf, and so forth, and the purchaser of the remainder of the mineralised ground, should have facilities for borrowing money at the lowest possible rate of interest, under a Government guarantee, for sinking the shafts down to the reef, and for preliminary development, but only so long as the work is approved of by the Government Mining Engineer. The interest that had been guaranteed by the Government should be gradually repaid as soon as the mine reached the producing stage. It is hoped that, under some such scheme, a liberal flow of new capital may be induced for the purpose of exploiting the deep-levels of the Rand—for which, in truth, at present there seems to be no money whatever procurable.

The Mines Department, in common with every branch of the Civil Service in every Colony in South Africa, has had to initiate a policy of retrenchment in sympathy with the very serious financial depression that has steadily overshadowed the sub-continent. Moreover, the necessity for retrenchment has been emphasised by the substantial shrinkage of revenue arising out of the wholesale abandonment of claims in every mining district of the Colony.

Transvaal Mining Regulations.

To the large body of workers actively engaged in the operations of the enormous mining industry of the Transvaal, the Mining Regulations are of even more importance than are the various mining laws, since on these regulations greatly depend the health and safety of the individual, and the preservation of much valuable property. There are special features connected with the Transvaal mining industry which force into unusual prominence the necessity for adequate provision in this direction; for, although mining in the outside districts is steadily attracting more attention and assuming larger proportions, fully 98 per cent. of the Transvaal gold output is to-day furnished by the Witwatersrand goldfield—an exceedingly diminutive area for so enormous a capital to be concentrated in. From a glance at the map it will be seen that all the railways of South Africa converge at Johannesburg—the largest town in the sub-continent, and entirely the outcome of an industry that has within the space of 20 years advanced the civilisation of the whole country by more than a century. Nowhere in the world is there a mining area nearly approaching it in importance, nor is there any region where mining at such great depth is practised on so huge a scale. The foundation upon which this unique industrial structure rests is the unparalleled regularity in the size, conditions, and gold-contents of the conglomerate beds—a geological occurrence that, from the economic standpoint, affords in its best exponents as stable a basis

for technical and financial calculations as does a coalfield. Under these very special conditions it is, therefore, justifiable for the directors of the large mining corporations to expend enormous sums of money in sinking, developing, and equipping their properties—sums which in each of the newer and better equipped mines average about three-quarters of a million sterling. In the circumstances it is no wonder that extraordinary precautions are called for in order to preserve health and safety and to safeguard property, or that in response to these stringent requirements the Transvaal Mining Regulations have been evolved as the best and the most efficient code in the world. That this is so is clearly recognised amongst expert mining men everywhere, and credit for it is universally and ungrudgingly given to the Government Mining Engineer's Department of the old *régime*. No more hearty acknowledgment is rendered to Mr. Klimke and his late staff than by the present Mines Department, which is worthily upholding the honourable traditions of its predecessors in its recent achievements in the direction of mines sanitation. In this important department alone the pre-eminence of the mining regulations is perhaps even more marked than in other directions, for there is a startling contrast between the Transvaal Colony and some countries in Europe, where provision for sanitation underground is simply conspicuous by its entire absence, in spite of the long period during which mining has been an established industry.

The executive duties on the Witwatersrand Mines are carried out by a resident manager and staff under direction of the central administration (controlled by a general manager), residing at the headquarters of the company in Johannesburg, and in constant touch with the Board of Directors. The actual work on the mine is performed by white men, assisted by unskilled coloured labourers —natives or Chinese coolies. The white workers are divided into two classes—those engaged in duties involving technical skill, and those engaged in work entailing a certain amount of risk to life and limb, or extra responsibility. The ratio between the numbers of white and coloured workers will be found to average to-day very much as it did prior to the war—that is to say, roughly, one skilled worker to nine unskilled. Of the skilled (or white) workers some 42 per cent. are engaged underground, and 58 per cent. on the surface. With unskilled labour the proportion generally is reversed. Of the natives some 67 per cent. and of the Chinese 80 per cent. work underground.

Only three points in connection with the Mining Regulations it is proposed now to consider—Accidents, Sanitation, and Ventilation. With regard to accidents, it is necessary to commence by pointing out that in the regulations the definition of an accident (based essentially on the worker being incapacitated from work for 14 days) is so clear and full that there is every liability to err on the side of reporting the less serious cases. In comparing the proportion of mine accidents on the Witwatersrand with that of (say) Great Britain, it must be realised that in the home country there is *no* definition of the severity of "accidents" laid down by statute; consequently the list in the South African mining centre is swelled by a large number of such comparatively trivial accidents as bruised fingers. Another most pertinent fact to note is that the Transvaal mining industry suffers from an incredibly disproportionate percentage of unskilled labourers absolutely ignorant of, and indifferent to, the forces of nature harnessed by Western civilisation to industrial enterprise, and familiar from childhood to the most unsophisticated of Europeans. To the majority of the readers of these notes, the utter incapacity of the "raw" native or of the average Chinese coolie to appreciate the force impelling a skip or cage when rising or sinking, machinery when in motion, or trucks when travelling, or to comprehend the danger latent in a wire charged with electricity, or in the commonest explosive, would be simply incredible. It may be imagined, therefore, how large is the roll of the injured amongst these light-hearted innocents, in spite of every well-meaning effort of their overlookers to warn them of danger. Another factor making for risk is the general callousness towards pain and the startling carelessness of life that distinguish the native and the Chinaman on their first introduction to work on the mines—a factor that makes it almost impossible to "save them from themselves." The white miner, it is regrettable to state, is also frequently not only inexperienced, but ignorant, and managers have usually the utmost difficulty in obtaining the right class of workers—for so great is the demand for skilled miners throughout the world that the supply of expert and reliable men will not go round. In the hurry of underground work and in the lack of thoroughly efficient supervision it is found that the average "miner" habitually takes unnecessary risks. Amongst such risks must be classed "fall of roof," to which a large percentage of accidents are due; and this danger only the *skilled miner* can foresee and obviate. In those mines that have suffered most from such accidents there are now appointed at the instigation of the Mines Department an adequate number of Roof Inspectors, whose sole duty is to inspect all suspicious workings, to remove in good time all dangerous "hanging" rock, and to erect proper timbering. Turning to another source of mining risk, it has to be recorded that the breaking of a hauling rope in April, 1904, at the Robinson Deep mine, resulted in the death of 44 natives. This serious accident led the Government to go thoroughly into the question of the safety of persons travelling in shafts, and to appoint a commission (known as the Safety Catch Commission) — consisting of three official and 20 non-official members, and furnished with a grant of £2,000— for the purpose of carrying out tests of ropes and safety-catch appliances under normal working conditions. The terms of reference provided for inquiry into and report upon: (1) Winding Ropes—structure, material, preservation, examination, best method of testing, and best method of attaching ropes to the load; (2) the reliability and adaptability of safety-catches and appliances in the shafts. As all the chief mining centres in the world were circularised as an outcome of these investigations in order to obtain the most reliable information, it is hoped that a really workable safety-catch may be found. If this result be secured, the whole of civilised humanity will owe the deepest gratitude to the Witwatersrand Mining Industry.

The Department of Mines occasionally has an exceedingly difficult part to play in holding even the balance between the safety of the mine workers on the one hand and the legitimate profit of the mining company on the other. A noteworthy instance of such a difficulty, at present under negotiation in the case of the Cinderella Deep mine, arises out of the mining regulation that there must be, before the stoping of ore can be permitted, two shafts in or two means of exit from a deep-level mine—a precaution sufficiently obvious to the most uninformed as essential to the safety of the underground workers in event of such contingencies as a shaft fire, a sudden rush of water, or the "caving" of the rock through which the shaft is sunk. The Cinderella Deep mine has spent £240,000 in striking the Main Reef at a depth of 4,000 ft., and—as the ore is unusually rich—the directors are naturally most anxious, in the interests

of the long-suffering shareholders, to crush a certain quantity of this rich ore so as to prove the working value of the parts of the mine as they are opened up, and to defray in part the cost of development and the heavy interest payable on the capital which must be unproductive during the years occupied in sinking so deep a shaft, and in making connection with the nearest property working at a like depth. The nearest deep-level venture appears to be the Hercules mine, and it is estimated that at a fair approximation it will take three years to connect with its workings, and legally to permit of ore being stoped in the Cinderella Deep for crushing purposes. The natural delicacy of the position is, in this particular case, increased by the fact that the Cinderella Deep is in possession of a permit from the technical officials of the late Kruger *régime* to start crushing from its one very deep shaft; but the Mines Department rightly considers that, while such a permit may afford legal grounds to the mining company for claiming exemption from this particular piece of legislation, the present Administration is in no way relieved from its heavy moral obligation rigidly to protect the welfare of the underground workers. A compromise is likely to be arrived at whereby in this solitary instance the stringency of this regulation will be relaxed in favour of the mine in consideration of special precautions being maintained under strict supervision.

Turning to the subject of sanitation, it must be confessed that before the war a state of things had been permitted to obtain in some mines that was as disgusting as it was disgraceful and dangerous. Now, however, strict regulations exist and are enforced for the separate sanitary accommodation of the whites, the natives, and the Chinese respectively. The result is that to-day the parts of the underground Rand that are in active use are as inoffensive and healthy as can reasonably be expected.

On the subject of ventilation there is not a great deal to say, as there are no noxious emanations given off by the rocks or minerals of the Witwatersrand formation—the "gassing" on the mines of the Rand being caused by the more or less imperfect combustion of nitrous explosives. It is but seldom that artificial ventilation has been found needful. In the majority of mines there is communication at several points with the contiguous workings, thus ensuring a good current of air through the principal passages. Closely linked with the question of ventilation is that of the lamentable prevalence of miner's phthisis. A special Phthisis Commission appointed by the Government has issued an able report containing recommendations for the use of dust-laying appliances underground, but owing to the utter indifference with which practical dust-laying methods have been received by the persons (the miners themselves) for whose benefit the whole subject of miner's phthisis prevention was investigated, it has been found necessary to legalise certain regulations based upon recent British rules, altered to meet local circumstances. These are added to the Health Rules of the Mining Regulations. For all practical purposes the chief causes of miner's phthisis may be thus summarised:—(1) Returning immediately after firing to a "working face" to re-blast a cut, or to charge and blast casing holes, and the inhalation of large quantities of sharp flinty dust and imperfectly exploded nitro-glycerine thus caused, has probably been responsible for the majority of deaths from phthisis; (2) drilling in "rises" or dry holes in any place, the general dustiness of working places, and the large amount of dust disturbed when shovelling after a blast. The natural and simple method of preventing dust is the use on the "face" of ample water (not as a fine spray), together with a strong draught—both these methods being fairly simple of attainment, and not so costly as unduly to increase working costs. It may be stated that public opinion is steadily showing a tendency to prepare the financial firms controlling the various "groups" for the necessity—especially in exceedingly deep mines—for mechanical ventilation, say by fans or some equivalent appliance, as contrasted with the compressed air liberated at the working faces as "exhaust" from rock-drills and other air-driven mechanism.

Manufacture and Importation of Explosives.

THAT section of the Government Mining Engineer's branch concerning itself with the manufacture and importation of explosives has, by reason of the enormous consumption of blasting materials in the mines, exceedingly responsible duties to perform. The official who is directly charged with these duties is the Chief Inspector of Explosives, acting under the "Explosives Ordinance of 1905" and the "Explosives Regulations" (Government Notice No. 121 of 1906). The sources of the supply of explosives for the Transvaal are: (1) the Transvaal Factory, situated at Modderfontein, some ten miles north-east of Johannesburg; (2) the De Beers Factory in the Cape Colony; (3) the importation on permit of explosives contained in the "authorised" list of Great Britain. Elsewhere in this volume a more detailed reference is made to the Modderfontein Factory. Its output of "high" nitro-compound explosives—blasting gelatine, gelignite, and the various grades of dynamite almost exclusively used in the Transvaal Colony—is the biggest in the world. That of the De Beers Cape Colony Factory is the second greatest. Importation is normally possible only upon permit from the Inspector, and is the principal channel by which gunpowder, cartridges (sporting and blasting, as well as military), safety fuse, detonators, percussion caps, and fireworks, reach the Colony from overseas. All ammunition and arms, outside of those for military use, come within the jurisdiction of the Colonial Secretary, being dealt with under Ordinance 13 of 1902. Any explosive not on the "authorised" list as published in the *Government Gazette* (Notice No. 431 of 1906) would have to be authorised in order to permit of importation or manufacture. The precautions enforced with reference to the transport of explosives are very strict. Perhaps those of most interest to the general public concern the removal, frequently by wagon, of nitro-glycerine compounds to and about the mines—in which connection it may be mentioned that no load is permitted greater than 6,000 lbs. (100 cases), that a walking pace must not be exceeded, and that the drivers must be entered in a list after having passed

as qualified upon examination. "Continuous" permits, solely for the transportation of explosives from place to place, are renewable half-yearly. The storage and use of explosives on mines comes outside the responsibility of the Inspector of Explosives, who concerns himself more with their manufacture and distribution to the non-mining consumers. The largest magazine under the Inspector's control has a capacity of 50 tons (2,000 cases). All magazines must conform in their construction to a carefully-considered specification. On the mines at the present time they may not have a capacity of more than 12½ tons (500 cases); but new regulations have lately become operative which alter the Mining Regulations in favour of the large consumers, so as to permit of distributing magazines, storing a supply limited only at the discretion of the Government Mining Engineer.

All dealers in explosives necessarily require a licence. No dealer may sell to any person unable to produce a permit to purchase. Recognised miners obtain from the Inspector of Mines, after examination, a "blasting certificate." Outside of mining operations no person may superintend blasting of any description who is not in possession of a certificate of competency from the Inspector of Explosives, or—in outlying districts—from a Resident Magistrate. In isolated regions prospectors and others, who can satisfy the Inspector that they have requisite knowledge and proper occasion, can obtain up to 20 (but usually only ten, or fewer) cases of explosives—the details of storage, and so forth, varying according to the instructions given by the official, at his discretion.

A Prospecting Party, Western Transvaal.

The Foreign Labour Department.

THE Foreign Labour Department came into existence on the 19th May, 1904, when the Labour Importation Ordinance (No. 17 of 1904) became law in the Transvaal upon notification of the Royal Assent. Thus a new Government department was requisite, to initiate and supervise the carrying out of the elaborate arrangements devised for the purpose of establishing Chinese labour on the mines of the Witwatersrand—without injury to the social structure of the community, to its commercial interests, or to the alien labourers themselves.

The main provisions of the Labour Importation Ordinance are:—That no person or association may import labourers under the Act without being duly licensed; that no indentured native labourer other than South African may be introduced into the Colony save under the Act; that indentured labourers imported under the Act be employed in unskilled labour only, and solely within the Witwatersrand district; that all licences and contracts granted and made under the Act be duly registered in the office of the Superintendent of the Foreign Labour Department; that no licences be granted unless and until the Lieutenant-Governor is satisfied that the accommodation provided for such labourers in transit and on arrival is ample and suitable; that proper and efficient measures be taken for the control of labourers in transit and on landing, and efficient medical supervision be secured for the examination, treatment, and if necessary for the segregation of labourers; that no contract with a labourer under the Act be for a longer term than three years, renewable on the same terms and conditions, if agreeable to both contracting parties, for a further term not exceeding three years; that on the termination of such contract, either by time, illness, unsuitability, or refractory conduct, the labourer be repatriated with the least possible delay, in all cases to the port of shipment; that no labourer under the Act be allowed to remain as a permanent inhabitant of the country, be employed by any other person in any other capacity than that of unskilled labourer on the mines, or be permitted directly or indirectly to own or lease property or take out trading licences or mining licences; that no labourer be removed or transferred from the place of his employment without due sanction of the Superintendent; that the Superintendent and other duly appointed officials of the Labour Department shall have access at all times to the mines, compounds, and other places where such labourers are employed and accommodated, to inspect the condition and treatment of the labourers, and to hear complaints and grievances, and if necessary inquire into same; that all labourers shall carry a prescribed identification passport, and shall in no case leave the premises on which they are accommodated without a permit, available for not longer than 48 hours; that importers of labourers shall keep a proper register (open at all times to the inspection of the Superintendent of the Labour Department) containing entries of all labourers employed by them under the Act, and all deaths, transfers, desertions, or unlawful absences, among the labourers, or offences committed by them; that any labourer may be accompanied by his wife, and children under ten years of age, should he so desire, expenses of importation and repatriation of such families being met by the importer; that no family be allowed to enter the Colony excepting under the Act, nor to remain in the Colony after the death or repatriation of the husband or father; that any labourer, on landing in South Africa, be at once repatriated at the importer's expense, should it be discovered that, owing to lack of proper explanation, he did not understand the terms of his contract, and does not desire to proceed to the Transvaal; that any labourer desiring to terminate his contract may at any time do so, on producing the sum necessary to cover his importation and repatriation expenses; that the Lieutenant-Governor have power to order the repatriation, at the expense of the importer, of any labourer declared to be medically unfit, or of unsound mind, and at the expense of the labourer or labourers themselves of any who have served imprisonment for misconduct.

Further regulations under the Act (published in the *Government Gazette*, June, 1905) provide that proper medical attention and assistance shall be given to imported labourers and their families by the importer; that no labourer be allowed to enter the Colony without a certificate of vaccination; that the wages of every labourer be paid monthly, in current coin of the realm, without deduction save on account of any advance made to him on signature of his contract; that every labourer shall have provided for him six days' work per week, unless it be impossible to work by reason of weather or other unavoidable cause, and any labourer ready and willing to work shall be entitled to his day's wages should no work be provided for him without sufficient cause; that Sundays, Good Friday, Christmas Day, and Chinese festivals be holidays; that every labourer shall have access to courts of law, or to the office of the Superintendent, to obtain redress for injury or injustice; that suitable accommodation be provided for families of labourers, such families being under proper supervision, and a register of births and deaths among them being kept; and that only those labourers be allowed to land in South Africa who shall have been recruited by the properly-accredited agents of the Chamber of Mines Labour Importation Agency and the Foreign Labour Department, and embarked on duly-licensed vessels.

The Convention between Great Britain and China, signed by the respective sovereigns in 1860, and renewed by plenipotentiaries in 1904, prescribes that the Chinese labourers for British Colonies must be embarked from the Treaty Ports only; that the local authorities at the ports shall take steps to facilitate emigration, and appoint officials, to be known as the Chinese Inspectors, to co-operate with the British Consuls in making the terms of indenture and the code of regulations known to the coolies and to the public generally; that the Chinese offices, depôts, etc., of the Emigration Agents and the Chinese Inspectors and their staffs be approved by the British Consuls and the Chinese Inspectors, and be fitted up and maintained at the expense of the British Government; that efficient means be taken to ensure that all coolies, before and after signing the contracts, shall have full opportunity to acquaint themselves with the terms of contract, and to withdraw if desirous of so doing;

that qualified medical officers nominated by the British Consuls, as well as those retained by the Chamber of Mines Labour Importation Agency, examine thoroughly each labourer under contract before embarkation; that the Chinese Government appoint a Consul for the Colony whither such labourers are bound, and that ships conveying such labourers be found and fitted according to the regulations of the British Indian Emigration Act of 1883 (further strict injunctions being issued as to dietary, medical supervision and stores, and sundry other points). Stringent regulations, promulgated by the Lieutenant-Governor of the Transvaal, and addressed to the Transvaal Emigration Agents in China, lay down rules to be adopted in appointing and issuing licenees to recruiting agents, in enforcing honest methods of recruiting, in making known to recruits the kind of labour required, and the laws and conditions to which imported labourers will be subject on the Witwatersrand; and prescribe methods to be observed in controlling the depôts at the Treaty Ports where the recruits are received, in chartering vessels, in licensing shipmasters and appointing medical officers and assistants, and in carrying out the rules for vaccination, identification, and notification of family and address of labourers, and of the scale of wages and advances to be made to them.

The Foreign Labour Department has its headquarters in Johannesburg, and offices and staff at Durban, and at the Treaty Ports in China from which labourers are shipped. The head office in Johannesburg is situated in Commissioner-street East, a Court for the trial of Chinese cases occupying part of the same premises. The staff consists of a superintendent, secretary and assistant secretary, Chief Inspector and Travelling Inspector, and inspectors and clerks of the court for Johannesburg, Krugersdorp, Florida, Denver, Simmer & Jack, Germiston, Boksburg, Benoni, and Durban respectively. One Chinese orderly clerk is attached to each Inspector's court or staff. A boarding officer is retained at Durban, with a small staff, to inspect vessels on their arrival with coolies, and to see that there is no carelessness or evasion of the regulations. The Identification branch of the department has a staff of seven, and the Record and Intelligence branch has five British and two Chinese clerks. It is the duty of officials of the Identification branch to attend at Durban for the purpose of identifying, classifying, and registering coolies on their arrival. (The system of identification in use is the finger-print system evolved by Mr. E. Henry, C.S.I., Chief Commissioner of the Metropolitan Police Force, and at one time adviser to the military administration of Johannesburg — subsequent to the British occupation in 1900—on criminal and police matters. It has given excellent results in India and in England, is far in advance of any other known system of identification, and has been found, with a few modifications, most suitable for use. All ten finger-prints are taken, classified, and filed; the records are available for reference at any time, and, in all cases of conviction, release, repatriation, or death, are compared with the originals to ensure certainty in identification. In the Record Office are upwards of 500 pigeon-holes, each containing about 100 records.) Chinese interpreters were at first retained by the Department, but this system proved unwieldy and the cause of delay, and interpreters are now attached to magisterial courts in the Witwatersrand district. In many cases inspectors are military men with Chinese experience, all being conversant with the Chinese language. The Superintendent, indeed, preferred for a time to be under-staffed rather than engage unsuitable persons. The Transvaal Emigration Agents in China (also a branch of the Foreign Labour Department) comprise an agent and staff at each of the Treaty Ports of Chifu and Chin-wang-tao, and at Hong-Kong. These officials work in co-operation with the Chinese Inspectors appointed by the local Chinese authorities, the medical officers appointed by the British Consuls, and the accredited agents of the Chamber of Mines Labour Importation Agency. The duties of the Agents are to insist that no labourer shall be recruited against his will, and to satisfy themselves that each recruit signs the contract willingly, thoroughly understands its nature, and has a clear idea of the kind of labour he will be called upon to perform. The Emigration Agents also control the depôts in which recruits are gathered, supervise the medical examination, identification, and registration of each recruit, issue licences to recruiting agents, and inspect the vessels in which recruits are shipped. The officials of this branch have been seconded for service with the Foreign Labour Department from the Governments of Hong-Kong and the Federated Malay States, and from the Wei-hai-wei Regiment. The secretarial branch of the Department, in Johannesburg, includes male and female clerks, accountants, and Chinese writers. Sixteen constables of the Transvaal Town Police are also attached.

The duties of the Superintendent of the Foreign Labour Department were enlarged by an amendment to the Labour Importation Ordinance, providing that this official, and the inspectors appointed under him, have jurisdiction over all offences committed by Chinese labourers which constitute a breach of the Ordinance, and offences summarily triable by a Resident Magistrate's Court—committed by a labourer on the premises on which he is employed; and that these officials have power to administer oaths, to compel the attendance of witnesses, and to inflict such sentences as may be imposed by a Resident Magistrate. Under this amendment proper places of detention for offenders must be provided on mines employing Chinese labourers.

The general duties of the Department are: To watch over the welfare of the imported labourers; to give assistance in securing redress for any real grievance; to ensure there be no infringement or evasion of the provisions and precautions prescribed by the Ordinance and the Regulations and Instructions of the Lieutenant-Governor under the Ordinance, for the prevention of injustice and fraud, and for the maintenance of law and order; and to act as intermediary between the Chamber of Mines Labour Importation Agency and the labourers, and between the respective Governments of the Transvaal, the British Empire, and the Chinese Empire.

The approximate revenue and expenditure of the Foreign Labour Department for 1905 left the Imperial authorities with a surplus of some £35,000. The chief items of income were:—Passport fees, £57,000; fines, £2,000; fees accruing in China (ship licences, capitation fees, etc.), about £6,000—making a total of, roughly, £65,000. In salaries and allowances some £19,525 were expended, and other disbursements absorbed £9,826—giving a total of £29,351 paid out during the period. It must be realised that the gross revenue of £65,000 represents a contribution of the Mining Industry of the Witwatersrand towards the expenses of importing the coolies, and that this item ranks with other sums unrecoverable by the Mining Houses.

On June 30th, 1905, there were on the Witwatersrand and at Durban in transmission 41,303 Chinese labourers. The additional number of coolies who

had sailed for South Africa on the 30th June, 1906, was 15,108. Of these, 99 had died or been rejected on the voyage from China, and 99 were eliminated from the total for various causes at Durban. Of the remainder, 3,884 died or were repatriated or discharged during the year—the actual number of deaths on the Rand being 935. The total number of Chinese coolies available for mine work at the end of June, 1906, was 52,329. The official records under "Convictions and Sentences on Chinese Labourers" on the Witwatersrand for the year ended 30th June, 1906, showed 13,532 cases of crime. Of these, desertions, refusal to work, and unlawful absence from work accounted for 7,189. An analysis of the crimes committed gives the number as follows:—Murder 26, assault 708, housebreaking 210, forgery 307, theft 207.

The Foreign Labour Department was in the first instance organised by the Protector of Chinese for the Straits Settlement, whose services were lent to the Transvaal administration for a short period. A Consul-General was appointed by the Chinese Government, his duty being to watch over Chinese interests in the Transvaal. This official, who is in residence in Wolmarans-street, Johannesburg, has had much Western experience in London and Brussels, and has also held office at Singapore. Liu Ta-Jen (Lew Yuk-Lin) presented his credentials to the High Commissioner in Johannesburg on May 16th, 1905. His personal staff consists of two secretaries, an attaché, and a student. These gentlemen do not belong to the Diplomatic Service. The Consul-General is attached to the Chinese Diplomatic Service, and is in no way connected with the Foreign Labour Department, save by co-operation. He is accompanied in the Transvaal by his daughter, who attends an English school for girls in Parktown, Johannesburg.

A prospecting shaft on a "Gold" Farm.

Chinese Labour on the Rand.

WITH the unprecedented development of the mining industry of the Witwatersrand, the question of the supply of unskilled labour for the underground workings rapidly became acute. The mines on the Rand have never been worked up to their full capacity. In a country where the aboriginal has not as yet experienced any really urgent necessity to labour, preferring, with rare exceptions, to work for six or nine months only at a stretch, and where the white man of every nationality, whether immigrant or of South African birth or experience, considers unskilled labour to be derogatory, and declines to perform "Kaffir's work" or to accept "Kaffir's wages," the importation of alien labour was bound, sooner or later, to become a feature of the industrial system. Prior to the break caused by the war in South Africa, the question of the supply of unskilled labour had been anxiously considered by the heads of the mining industry, until the political crisis absorbed all minds, and left no room for the consideration of matters of industrial import. Not only on the Rand had this question to receive serious attention; in the Cape Colony, also, the shortage of native labour had created so difficult a situation that in 1890 a Commission was appointed to take evidence on the subject of the native labour resources of South Africa. Another Commission sat in 1893, and evidence taken by it went to show that the position in respect to industrial development was then regarded as acute. Excepting at rare intervals the mining industry had always been hampered by a shortage of unskilled labour. The result of representations by the Transvaal Chamber of Mines to members of the Boer administration and to the Volksraad was that Native Commissioners throughout the South African Republic were instructed to take every step in assisting the mining industry to procure labour, but there was little real relief afforded. The Native Commissioners were of opinion that, short of coercion, nothing would induce the Transvaal natives to work in greater numbers, and to coercive measures Mr. Kruger very properly refused his sanction. An arrangement with the Government of the Portuguese East African possessions gave a steady supply of natives from the East Coast territories, but efforts to supplement this number with natives recruited in Portuguese and German West Africa proved unavailing. The Government of India, approached with a view to obtaining British Indian labourers for the mines, would appear to have discouraged the proposal (revived subsequent to the war, but with the same result), and the scheme was abandoned. Proposals to introduce Chinese coolies, and to procure a supply of Italian labourers, were discussed and relinquished—the latter as being too expensive a project, and open to other objections; the former as being altogether undesirable, in the absence of any legislation by which coolies might be repatriated and prevented from becoming permanent settlers in the country—as had happened in Australia and in the United States. Thus the question remained open until 1900. With the resumption of mining operations on the conclusion of hostilities the shortage of labour was acutely felt, in view of the increasingly large number of skilled artisans

Chinese Coolies shovelling into Ore-conveyor (*Simmer & Jack Proprietary Mines, Ltd.*).

anxious to resume employment, and the additional numbers daily pouring into the country to seek their fortune, men either disbanded from irregular military corps or entirely newcomers. During the progress of hostilities natives had become unsettled and disinclined for service of any kind. Very many were in the employ of the military, drawing (in comparison with what they had hitherto been accustomed) very high pay and allowances for little or no real work. An ill-timed effort to reduce the wages paid to mine labourers still further lessened the attractions held out to the natives in this form of employment. An attempt, which was highly unpopular with both employers and employed, was made to utilise unskilled white labour, and the economic success or failure of this experiment, and the possibility of its renewal on a larger and more systematic scale, has not yet ceased to be a matter for acrimonious discussion. One point, however, was established beyond dispute—that there was little reliance to be placed upon white labour for unskilled work, as the periods of service were far shorter than those of the native at his worst. A certain number of white unskilled labourers have been employed by one or two of the mining houses ever since the war. There are of these some 500 or 600 in all. No attempt has been made to replace them by natives or coolies; nevertheless, it is a significant fact that, in order to maintain undiminished this comparatively trifling supply of white employés, over 2,000 men passed through the hands of the employers in 1904—a year of profound depression when large numbers were out of employment on the Witwatersrand. The "Randlords" have been accused of setting their faces against an overwhelming increase of the white labour element on the Witwatersrand, in view of the possibility of labour strikes and agitations, and of political troubles, and undoubtedly there is much to support this view. On the other hand the opinion expressed by Sir George Farrar, in his presidential address, on moving the adoption of the fifteenth annual report of the Chamber of Mines, found a wide echo in the minds and hearts of South Africans of all classes. The President of the Chamber said:—"I must say I see no cause to regret the small number of white men engaged in rough labour . . . . The white man, to compete with any coloured labourer in this country, must . . . . occupy a most undesirable place in the social scale. We want to see the white man take and keep his proper place, . . . and in expressing the opinion that white men can be better employed than in working side by side with the Kaffir, I must admit that I am greatly influenced by sentiment—a sentiment of which I am in no way ashamed." When the war terminated, the increasing demand for native labour made by the railways, municipalities, and public works added to the difficulties of the situation, and a Commission, appointed by Lord Milner in 1903 to inquire into the native labour resources of the sub-continent, and to take evidence in all the British Colonies, found there was a general insufficiency throughout South Africa, and that there had been a constant shortage in all centres of local industry, as well as on the Witwatersrand. A dissenting minority report was signed and presented by two members. In spite of the overwhelmingly large native population carried by

Chinese Coolies hand-drilling in a wide stope (Simmer & Jack Proprietary Mines, Ltd.).

Natal and Zululand, the Colony of Natal finds it necessary constantly to nerease the supply of indentured British Indian labour, with the knowledge that these coolies will eventuallly settle on the soil, and compete with previous Indian immigrants, as well as with European settlers, in trade, commerce, and agrieulture. In this connection it may be here mentioned that during Lord Selborne's term of offiee as High Commissioner repeated application was made to him by Boer farmers in the Transvaal and Orange River Colonies for permission to introduce indentured British Indian labour for their farms on the same terms as do the Natal farmers. No more striking proof of the difficulty of obtaining labour for every kind of employment could be furnished than is implied in this request, when the prejudice entertained against Asiatic settlers in the two new Colonies is taken into consideration. At a Conference held in Bloemfontein in 1903, at which all the South African Colonies were represented by delegates, for the purpose of discussing matters of importanee to the general welfare, a resolution was unanimously passed lamenting the universal shortage of native labour throughout South Africa. Without the importation of alien unskilled labour there remained, then, nothing but what Lord Selborne, in a despatch to Lord Elgin, deseribed as "the outrageous expedient of foreing the native inhabitants of the country to work for white employers." The insuperable objections to this system under British rule, apart from the danger of fomenting rebellion among the native tribes, need not be dwelt upon. The heads of the mining industry, therefore, reverted to pre-war proposals, and the report of Mr. Ross Skinner, Commissioner for the Chamber of Mines in California, British Columbia, the Federated Malay States, and China, furnished the basis of plans for the importation of Chinese indentured unskilled labour. Mr. Skinner held the position of mine manager on the West Rand, and by appointment of the Chamber of Mines in 1903 undertook an important mission of inquiry, with a view to aseertaining what available resources for the reeruiting of labour existed in China, and what were the results of the employment of Chinese labour in other parts of the world. His report was presented in Oetober, 1903. The Chamber of Mines adopted a resolution urging upon the Transvaal administration the necessity for legislation to assist the labour needs of the Colony. On December 28th, 1903, Sir George Farrar introdneed into the Transvaal Legislative Conneil a draft ordinance for the importation of alien indentured unskilled labour. The measure had the full support of Sir Arthur Lawley's Executive, and was passed in the Conneil with a majority of 22 members against four. The debate on the Labour Importation Ordinance lasted three days; the Ordinance was gazetted on February 10th, and became law on May 19th.

CHINESE MINE BOYS.

1904. Few Acts of Colonial legislation have created more sensation. From the first it engaged the steady opposition of the Liberal party in the United Kingdom, and an adjournment of the House of Commons to discuss the principles of the new Law caused the temporary suspension of the Ordinance. Upon this attitude of the Home Opposition becoming manifest, a petition in favour of the principles of the measure, bearing some 45,000 signatures of dwellers in the Witwatersrand towns and districts, was presented to Lord Milner in January, 1904. Excited meetings were held throughout the Transvaal Colony, those in the country districts being chiefly averse to, and those along the Witwatersrand in favour of, the importation of Chinese labour. In the other Colonies of South Africa numerous public meetings of protest were held. The excitement on the Witwatersrand culminated at a gathering organised by two prominent citizens of Johannesburg to protest against the introduction of Chinese. A densely-packed opposition, consisting principally of miners, howled down the speakers for upwards of an hour, and refused to permit any discussion. The minority were equally energetic, if less powerful. Statements that bribery and corruption — in "packing" meetings and in securing signatures to the petition—had been freely resorted to, were circulated in all directions, and the "campaign of calumny" raged for a brief period as fiercely in the Transvaal as it did in the United Kingdom. The leaders of the industry maintained a dignified attitude throughout, and little notice was taken of the scurrilous attacks, with which the honest leaders of the opposition were in no way associated. The result of the Ordinance upon the General Election of 1905 throughout Great Britain is a matter of history, and the official correspondence between Lord Selborne and Lord Elgin during 1905-6 is evidence of the amazing nature of the misunderstandings concerning the real working of the Ordinance, and the allegations as to treatment meted out to the imported labourers. It cannot be denied that irregularities and illegalities occurred during the initial stages of the Chinese labour experiment. It would be a miracle if they had not; this is only to say that the Ordinance was passed and administered by human beings. But that anything in the nature of "slavery," "torture," or barbarous and inhuman methods of control was ever sanctioned or enforced under authority has been clearly and convincingly disproved, although the refutations have never been granted the publicity given to the accusations. It is noticeable that, although the Labour Importation Ordinance makes no stipulation as to the nationality of imported labourers, no serious attempt has been made to procure labour other than Chinese. This intention so to confine the scope of its powers is implicitly indicated in the regulations of the Lieutenant-Governor, published in June, 1904, under the Ordinance, and in the simultaneous publication of the text of the Convention between the Government of the British Empire and the Chinese imperial authorities. On the passing of the first reading of the Labour Importation Ordinance, the Labour Importation Agency, Ltd., was organised by the Johannesburg Chamber of Mines, on much the same lines as the Witwatersrand Native Labour Association. The Board was

Chinese Coolies underground, shovelling into shaking-shoot, which conveys the Ore from the stopes to the trucks.

formed of the Executive Committee of the Chamber, with power to add to its number. Major the Hon. W. L. Bagot, who has held position in Johannesburg under the military administration, was appointed general manager. The Ageney constituted the medium through which the recruiting, embarkation, receiving, and distribution of the Chinese coolies, subject to the regulations of the Ordinance and the supervision of the Foreign Labour Department, could be most expeditiously and systematically carried out by the mining groups. The staff comprised the general manager's secretarial assistance in Johannesburg, the officials and conductors of the recruiting depôt at Durban, the agents in China, and the necessary medical officers. Mr. Perry, Chairman of the Witwatersrand Native Labour Association (formerly Imperial Secretary to the High Commissioner for South Africa), and Mr. J. G. Hamilton (of Messrs. Neumann & Co.)—a vice-president of the Chamber of Mines—were despatched to China to make preliminary arrangements, and preparations were so briskly set on foot, both in South Africa and in China, that the shipping of coolies commenced almost immediately the Ordinance came into operation. The first vessel, with coolies destined for the mines of the East Rand, sailed from Hong-Kong for Durban (the recognised port of entry) in June, 1904. While the Government bore the cost and controlled the offices and depôts of the emigration agents in China, the onus of making all arrangements and finding means of meeting difficulties was undertaken by the Labour Importation Ageney. In all, eighteen ships were chartered. (Only two of these remained on the strength of the Ageney's staff at the beginning of 1906.) All the vessels were provided with medical officers and Chinese medical assistants. At Durban, near the picturesque suburb of Clairmont, the area known as Jacob's Camp (which had been used for a Boer concentration camp during the war), was acquired by the Ageney and equipped for the reception of the coolies. The camp is laid out in two large compounds, with married and single quarters for the white staff, and is fitted with most elaborate conveniences for cooking, washing, bathing, and sanitary requirements. The boarding officers of the Foreign Labour Department, and the port medical officer, each visit the vessels before any disembarkation of coolies takes place, and no labourer suffering from infectious disease is allowed to land. Identification officials of the Department also attend, and take impressions of finger-tips as soon as the coolies reach the compounds. A slight meal on arrival, a substantial one later on, and tea at all hours, are served for the coolies at Jacob's Camp. Very few hours elapse before the Chinese are entrained for the Rand. Each vessel conveys between one and two thousand coolies, and each train carries between four and five hundred. A conductor, whose special duty it is to control the coolies, accompanies each train, and is responsible for the safe delivery at their destination of the number placed in his charge. The journey from Durban to the Rand occupies some 27 hours, and during that period three substantial meals are served to the men, consisting of meat, fish, bread, rice, and tea. The mines employing Chinese labourers at the end of May, 1906, and the approximate number of coolies then engaged are shown in the following table:—

Group.	*Mine.*	*Number of Coolies.*
East Rand Proprietary Mines, Ltd. ..	Angelo Gold-mining Co., Ltd. ..	2,169
	New Comet Gold-mining Co., Ltd.	1,021
Geduld Proprietary Gold-mining Co., Ltd.	Cason Gold-mining Co., Ltd. ..	(No fixed number).
General Mining and Finance Corporation, Ltd. (eastern section) ..	Geduld Proprietary Mines, Ltd. ..	479
Ditto (western section) ..	Van Ryn Estate and Gold Mines, Ltd.	965
	Rand Collieries, Ltd.	400
Randfontein Estates Gold-mining Co., Ltd.	Aurora West United Gold-mining Co., Ltd.	267
	North Randfontein Gold-mining Co., Ltd.	1,862
New Kleinfontein Co., Ltd.	Kleinfontein Deep, Ltd.	3,114
	Benoni Gold-mining Co., Ltd. ..	
	Rand Klipfontein Co., Ltd. ..	
Consolidated Langlaagte Mines, Ltd. ..	—	1,834
Durban Roodepoort Deep, Ltd.	—	816
French Rand Gold-mining Co., Ltd. ..	—	2,122
Glen Deep, Ltd.	—	1,875
Geldenhuis Deep, Ltd.	—	1,499
Henry Nourse Gold-mining Co., Ltd. ..	—	1,258
Jumpers Deep, Ltd.	—	1,377
Jupiter Gold-mining Co., Ltd.	—	544
Lancaster Gold-mining Co., Ltd.	—	1,040
Modderfontein Extension, Ltd.	—	(No fixed number).
New Modderfontein Gold-mining Co., Ltd.	—	1,206
New Heriot Gold-mining Co., Ltd. ..	—	(No fixed number).
New Rietfontein Gold-mining Co., Ltd. ..	—	(No fixed number).
Nourse Deep, Ltd.	—	1,076
Princess Estate and Gold-mining Co., Ltd.	—	1,360
Roodepoort Gold-mining Co., Ltd. ..	—	400
Rose Deep, Ltd.	—	1,464
Simmer & Jack Proprietary Mines, Ltd.	—	4,402
Simmer & Jack East, Ltd.	—	1,165
South Nourse, Ltd.	—	242
South Rose Deep, Ltd.	—	(No fixed number).
South Geldenhuis Deep, Ltd.	—	234
Tudor Gold-mining Co., Ltd.	—	(No fixed number).
Van Dyk Proprietary Mines, Ltd. ..	—	(No fixed number).
Village Deep, Ltd.	—	(No fixed number).
Witwatersrand Gold-mining Co., Ltd. ..	—	2,962
Witwatersrand Deep, Ltd.	—	3,157

Much expenditure has been incurred on building or re-modelling the compounds in which the coolies are accommodated. Special attention has been paid to ventilation, area, window space, and other details relating to sanitation—matters which have been advised upon by the Medical Officers of Health for the Transvaal and for Johannesburg, by a committee representing the Medical Association of the Transvaal, and by a commission appointed by the Lieutenant-Governor. The conditions of the compounds are pronounced to be superior to those of common lodging-houses or elementary school-rooms as allowed by law in the United Kingdom. The floors are impervious to damp or other contamination, no bunks or obstructions of any description are allowed to be placed across window spaces, and 250 cubic feet of air space is allowed per coolie. The sleeping-rooms accommodate from 20 to 40 inmates (an average of one-third being always on shift duty), and bunks are placed around the apartment in not more than two rows. The bunks are steel-framed, with removable plank floors. The kitchen facilities are spacious and convenient, with steam cooking apparatus installed. Hot tea or limejuice is available day and night, besides substantial meals at stated times. Chinese cooks only are employed, and the food is plentiful and of the best quality. It is beyond question that the food, accommodation and medical care provided for the Chinese labourers is not only superior to anything these coolies have known before, but has resulted in improved conditions in every direction for all South African natives employed on the Witwatersrand. The Chinese compounds are kept spotlessly clean—the conduct of the coolie in this respect comparing most favourably with that of the native. The Chamber of Mines arranged, with the first shipments of coolies, for the importation of special foods and clothing which were considered essential to the comfort and welfare of the men. By arrangement with local merchants and traders such

supplies are now imported and purchased through the usual commercial channels. The value of foodstuffs provided locally which were consumed by the Chinese labourers employed on the mines in 1905 was £313,376. Of these, rice, amounting to 17,371,923 lbs., cost £117,897; bread, 7,517,923 lbs., £58,237; meat, 6,154,268 lbs., £85,317; fish, 102,546 lbs., £1,623; tea, 83,741 lbs., £2,938; fresh vegetables, £31,115; other foods, £7,393. Drugs and medicines used during the period cost £7,772. The average cost of feeding a Chinese coolie is 11s. per month, much the same as the South African native, who incurs an average expenditure of 11s. 11d. per month to feed. In the compounds order is maintained by a compound manager and a staff of Chinese police (selected from among the coolies at the depôts in China prior to embarkation and after arrival at Durban). Many of these policemen have served in the Chinese army, or under British administration at Wei-hai-wei. Valuable assistance has been rendered by the Chinese police on shipboard, upon disembarkation, and in the compounds at Durban and on the Rand. The duty of the compound police is to report cases of refractory conduct or violence, to see that the gates are guarded, that the shifts turn out punctually, and that the sanitary regulations are strictly observed. Irregularities of conduct have been detected among the police as well as among the other coolies, and cases of petty tyranny have occurred, but these are not unknown among more highly civilised communities. Thirty policemen are found to be sufficient to keep order among 3,000 coolies. A Chinese or Chinese-speaking interpreter is retained at each compound.

ROOM IN A CHINESE COMPOUND (SIMMER & JACK).

The health of the coolies since their establishment at the mines has been on the whole excellent, with the exception of the men brought to the country in the earliest shipments, who were recruited in Southern China. Numbers of these suffered from beri-beri, and a comparatively large death-rate resulted from the cause. Many of the coolies were repatriated on account of the disease. Those who recovered, and proceeded to work, however, showed no signs of having suffered permanent injury to health. There is no reason to suppose that beri-beri is of an infectious nature. In the matter of flesh wounds and injuries the Chinese coolie shows himself to be more liable to septic infection than the native, although he is equally callous to what would appear to be great physical suffering. The Chinaman is apt in the taking of sanitary precautions, careful and abstemious in his diet, and particular in wearing clothing suitable to the seasons. The labourers from the Northern Chinese provinces are superior, in physique and constitution, to those from Southern China, and early in the experiment recruiting in the south of China was practically abandoned on this account. On eliminating the cases of beri-beri, of which there is not much likelihood of a recurrence, the death-rate stands at 18·386 per thousand per annum. The average number of sick from May 1st to December 31st, 1905, was 2·76 per cent. These figures cannot be regarded as anything but satisfactory. At the close of 1905 there had been 218 cases of fatal accident among the coolies, 85 of permanent injury, and 671 of temporary disablement. The large proportion of accidents was attributable in part to the inexperience of the

The keenest pleasure of the Coolie (Chinese gambling between the "dumps" on a Mine).

coolie in mining work—a matter which time will undoubtedly mend—and partly to his extraordinary inquisitiveness in regard to dynamite and other things as to the danger of which he is constantly warned. Statistics for the six months ended June 30th, 1906, showed 195 cases of fatal accident among coolies, and 293 cases of death by disease. It is interesting to compare these figures with those referring to native mine labourers. For the six months quoted, the official returns showed 324 cases of fatal accident among natives, and 1,639 cases of death by disease. The average monthly population in the mining area for the first three months of the half-year mentioned was: Chinese, 48,983; natives, 111,442; for the second three months: Chinese, 51,020; natives, 111,034

The mining authorities have arranged, for the coolies, a system of insurance against accident, similar to that instituted for South African natives. Chinese labourers have permission to bring to South Africa or to send for their wives, and young children, notification in Chinese to that effect being posted in all compounds. Only 15 per cent. of the labourers imported registered themselves as married men, and amongst these no desire whatever was expressed for the society of their womenfolk. At the time of writing only two Chinese women and 26 children had been reported as having proceeded to the Transvaal, and of these one woman and three children returned to China after a very brief period. One coolie only expressed a desire to be joined by his wife, but the woman, when discovered, flatly refused to undertake the journey. It is contrary to the Chinese national custom for respectable women to travel or to appear among strangers unless accompanied by older female relatives. A very small proportion of the wages earned by the coolies finds its way to China, although special arrangements exist with the postal authorities to facilitate the remittance of money. In the first six months of 1905 only £16,000, out of upwards of half a million sterling, was forwarded to China, and the sums banked were very insignificant. The bulk of the money earned by the Chinese labourers is spent by them locally, the Chinaman being—contrary to expectation—lavish spenders and purchasers. The wage rate paid to them is 1s. per shift of ten hours, with an increasing scale for improvement in work. At the end of the first month's service each coolie is entitled to the average pay of 50s. per month of 30 days. Many misunderstandings, and even riots, occurred owing to the difficulty in bringing the Chinese to understand that the calendar month is not, as is their lunar month, of 28 days. The average wage paid to the coolie per month is 52s. 10d., and to the Kaffir 56s. 6d. At the end of December, 1905, there were some 47,217 Chinese coolies employed on the Witwatersrand, with an approximate 2,000 on the sea in transit to South Africa. Of the number recruited and imported, amounting to about 50,000 men, 198 had purchased their discharge and were re-shipped to China; 936 had

died—this number including accidents while at work, murders committed by comrades, and all cases of death by disease (beri-beri and dysentery being the most frequent causes); and some 2,380 had been repatriated, by reason of infirmity, or unsuitability for the work, insanity, incapacity owing to illness or accident, or insubordination or criminal conduct. Of the 1,900 who had been repatriated in October, 1905, 1,233 endeavoured to re-engage at Chin-wang-tao, but were recognised and prevented, 222 were prevented from re-engaging themselves at Chifu, and upwards of 100 succeeded in evading identification and in returning to the Rand. Destitute coolies, repatriated on account of incapacity, are presented by the Ageney with the sum of five dollars and a suit of clothing on landing in China.

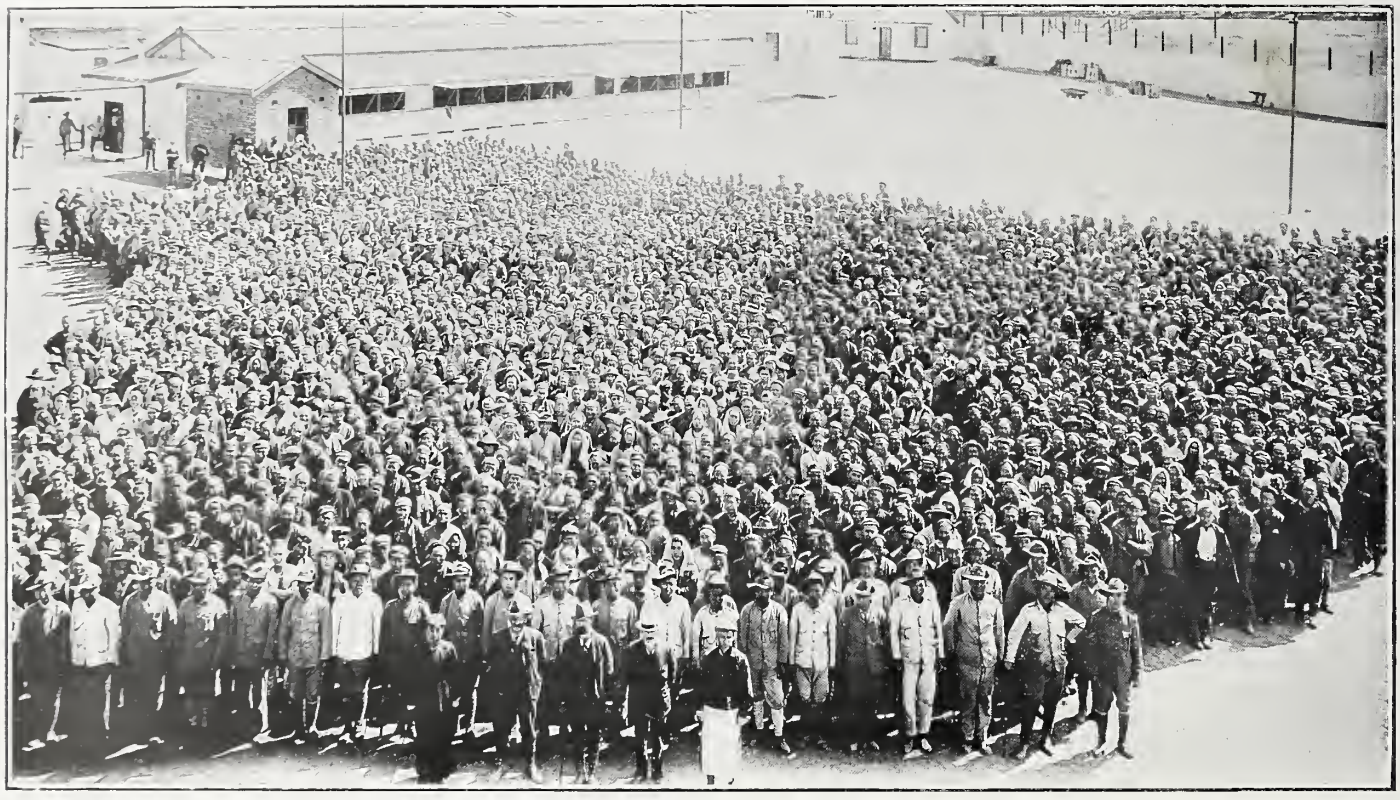
The total preliminary expenditure incurred by the Labour Importation Agency amounts to the substantial sum of £21 7s. per coolie. In addition, there is the outlay on fitting up the compounds according to regulation, which has amounted to an average of between £8 and £10 per coolie (a total of nearly half a million sterling having been thus expended). The non-recoverable expenses (which, during 1905, included £65,000 paid to the Foreign Labour Department of the Imperial Government) amount to £17 5s. per coolie, and are as under: –

	£	s.	d.
Recruiting	2	0	0
Voyage to Durban	5	0	0
Voyage back to China	5	0	0
Fee to Chinese Government	0	6	0
Fee to Transvaal Emigration Agent	0	2	0
"Keep" in depôt in China	0	5	0
Medical fees and drugs, etc.	0	3	3
Salaries of ship's doctors	0	2	9
Insurance	0	5	0
Bonus to ship's officers	0	2	6
"Keep" in depôt at Durban and in train	0	3	6
Ditto on departure	0	4	0
Train fare to Rand	1	0	0
Return fare	1	0	0
Amortisation of capital	0	8	11
Administration	0	17	3
Repatriation of unsuitables	0	5	0
	£17	5	2

There is also the liability to costs of bringing the wives and families of coolies to the Rand and providing suitable quarters for them. The mining companies are charged £11 10s. per coolie, and are liable to not less than £6 for repatriation. The Labour Importation Ageney pays £1,000 per annum to the Government of Natal for the services of the Port Medical Officer, and for those of the Natal Poliee who are detailed to protect the compounds at Jaeob's Camp. A pass-port fee of 2s. per month for each coolie must be paid to the Foreign Labour Department, this being equivalent to the "pass" fee payable for South Afriean natives. The difference in the eost of the Chinese coolie and the native averages £7 18s. per head.

The Chairman of the Board of the Labour Importation Agency is Mr. Perry, who is also Chairman of the Witwatersrand Native Labour Association.

The number of coolies who had been sentenced for offences of all descriptions at the end of 1905 was 7,429, many of these, however, being trivial cases of breach of regulations in the compounds and unlawful absenee from work other than attempted desertion. In May, 1906, there had been upwards of 100 cases of serious crime among the eoolies. These included riots in compounds, assaults on Chinese police and by Chinese poliee, assaults on mine officials, destruction of mine property, and outrages eommitted outside the mining area. Many acts of robbery, housebreaking, and violence, committed by coolies, occurred in those parts of the Heidelberg and Pretoria district adjacent to the Witwatersrand. These acts of crime increased in number during the early months of 1906. A Commission was appointed to inquire into the question of more effective eontrol being exercised over the eoolies, and the police service along the Rand had to be considerably strengthened.



Roll-call of 4,200 Coolies (Simmer & Jack Chinese compound).

The mines authorities were very generally blamed for not exercising sufficient supervision, and the indignation in country districts was extreme. These outrages undoubtedly strengthened the hands of the anti-Chinese party, which was largely composed of Boers and residents in the country unconnected with industrial or commercial pursuits. It must be borne in mind, however, that the mines authorities were greatly hampered in their efforts at efficient management of their employés by the regulations of the Ordinance, by the overlapping control of the Foreign Labour Department, by the wholesale and unfounded charges of brutality and "slavery," and by the suspicion and detestation entertained by the public of anything that might point to an introduction of the Kimberley "compound system." These diverse points occasioned the greatest difficulties, and made effective control almost impossible. Punishments, devised and inflicted on the spur of the moment, to quell a riot or to check an outbreak of serious crime, have been denounced as brutal and inhuman, while the crimes themselves have been used as evidence of the vicious instincts of the "filthy Chow." Each new phase or incident served one or other of the political parties to point its own special argument, the while it was matter of general knowledge that serious crimes and outrages, conflicts with the police and the public, and riots in which numbers were killed or injured, were frequently committed by native labourers, and that summary punishments were inflicted by employers to check worse disorder; and that this was of common occurrence in all the South African Colonies. In spite of every obstacle, however, it became apparent towards the middle of 1906 that the amount of crime by coolies was steadily diminishing. Rioting in compounds seemed to have ceased, and outrages in country places lessened in number and in violence. The criminal characters and professional gamblers, the main authors of the crimes, were gradually being identified, sentenced, and repatriated; the remainder, becoming more used to their surroundings and to their work, began to show themselves amenable to discipline in every way. Eight murders of white persons by Chinese had been recorded up to May, 1906. Of these, one case was that of a miner who was killed during the riot, his assailant or assailants being entirely unknown; in two other cases, attributed to Chinese, there was lacking any evidence to support the supposition. Several of the murderers remained undetected; those convicted suffered death by hanging. It is not apparent that this form of execution awakens any terror in the Chinese mind, which appears to dread death by beheading infinitely more. There have been no murders of white women by coolies, and only one case of criminal assault of such a nature as has made the native in South Africa a terror to all unprotected households where white women dwell. From this propensity the Chinaman seems comparatively free. It is also worthy of note that no cases of disorder or outrage by Chinese coolies on the Rand have taken place within the town area, although the streets and suburbs of Johannesburg are pervaded by numbers of coolies during week-ends and holidays. With respect to punishment by flogging, in many compounds coolies have actually petitioned that flogging be reinstated as a penalty for wrongdoing, in lieu of terms of imprisonment which entail loss of time and wages. Reporting in this connection, the Superintendent of the Foreign Labour Department considered it was wisest to treat the Chinese as far as possible on lines they knew and understood; and the High Commissioner, in a despatch to the Colonial Office, with strong good sense pointed out that the coolies neither understood the English language or the procedure of the Roman-Dutch law, and had been accustomed to "a totally different system, accompanied by the almost universal application of flogging in some form or another for every and any offence." Flogging, however, has been discontinued. At the initiative of the Campbell-Bannerman Ministry, under instructions to Lord Selborne from the Colonial Office, the Foreign Labour Department, in May, 1906, prepared posters for all compounds, the terms of which offered to assist such coolies as could not afford to purchase their discharge, by giving them passage to China at the expense of the British Government. This action was greatly resented by a large section of the community, as it was also by the mine-owners, and a case was brought in the Supreme Court of the Transvaal to test the legality of the action of the Foreign Labour Department officials. A verdict adverse to the plaintiffs was given, and the placards were duly posted in each compound. Some 58 coolies only made application for repatriation, thus disposing entirely of the charge of slavery and inhuman methods of treatment. The action of the Home Government, coming close upon an attempt to interfere with the Government of Natal in its dealings with natives convicted of rebellion and murder, raised an angry protest throughout South Africa. On the establishment of the Campbell-Bannerman Ministry in office, crowded meetings were held in Johannesburg and along the Rand to protest against the slanders concerning the treatment of Chinese labourers, which figured so largely at the General Election in Great Britain. On the placarding of the posters other indignation meetings were held on mines and in municipal areas on the Witwatersrand protesting against any interference with the unskilled labour supply. A deputation representing 10,000 white skilled workmen on the mines waited upon the High Commissioner, to urgently represent to him the distress and destitution which would ensue amongst the working classes were the Chinese labourers to be repatriated. The deputation was one of several representing the same views, organised by all classes and bodies in the commercial and industrial sections of the Colony. Sympathetic meetings were also held by municipal and commercial organisations in Natal and other Colonies. A feature of the agitation that deserves mention was that many who had at the outset most bitterly opposed the introduction of Chinese labour now strenuously resented the attempt to repatriate the labourers, and the slanders against those who introduced and employed them. The demand for a Royal Commission to investigate the conditions and treatment of the Chinese on the Rand, first suggested by the High Commissioner, and supported by the mining industry and the general public of the Transvaal, was refused by the Home Government.

In the early months of 1906 a Special Committee was appointed to inquire into the nature and causes of crime and desertions among Chinese coolies, and to suggest means whereby these might be lessened, and the coolies subjected to more efficient control. The committee was presided over by the Chief Justice of the Transvaal, and many witnesses were examined, including mine managers, consulting engineers to mining companies, members of the Executive of the Chamber of Mines and of the Labour Importation Agency, officials of the Foreign Labour Department and of the police forces and constabulary, members of the farming and agricultural community—mainly Dutch—from the districts adjoining the Witwatersrand area where outrages had occurred, miners, and persons employed in the various Chinese compounds. Mr. Lew, the Chinese Consul-General, had a seat on the Committee, and evidence both documentary and otherwise was put in by Chinese persons.

The report of the Committee, issued in May, embodied many useful recommendations whereby more efficient police supervision and greater control over the movements of the coolies might be ensured, consistently with the amount of personal freedom which the Ordinance decreed. Some of these recommendations dealt with the issuing of permits, which had not been arranged on one systematic basis throughout the Rand, each mine or group of mines having its own system; others dealt with the methods and distribution of the controlling police, and with the amount of freedom allowed in compounds, which was incompatible with the prevention of unlawful absence, gambling, and opium-smoking. The findings of the Committee embraced some most interesting statements and observations on Chinese national and individual habits of mind and thought, and some severe strictures on the unreliability of the Chinese mine police, who it was found frequently encouraged and battened on the evils they were enrolled to combat. Gambling was recognised as the most prolific source of trouble. This vice is deeply rooted in the Chinese national character, and outrage, robbery, and murder—frequently resorted to in desperation to pay "debts of honour"—are considered by the coolie far less disgraceful than failure to meet monetary obligations. Gambling debts had also been a frequent cause of desertion; professional gamblers lived in the compounds without doing a stroke of duty, their "shifts" being worked by debtors who, unable to pay, scored off their debts and assumed for this purpose the name and pass of their creditors. The Foreign Labour Department considers it almost impossible to find persons of Chinese nationality, conversant with the English language, of sufficient integrity to be trusted as controllers or police in the compounds, or as interpreters. This is one of the gravest difficulties which the department and the mining industry are called upon to meet. Englishmen, mostly of military service, even if not fluent in Chinese dialects, have been found to be without exception the most satisfactory inspectors and the most conscientious and useful interpreters.

Most of the Committee's recommendations were carried into effect, and a certain number of European police were appointed for special service in each Chinese compound.

The proclamation offering a free passage to China to all coolies (a) who were without means, (b) who had been entrapped into a contract which had not been properly understood, or (c) who were dissatisfied or discouraged with their work and conditions, was replaced by an amended offer, entirely novel in the history of indentured labour, and constituting a very grave precedent from the point of view of the employers. It must be borne in mind that the sole object of the Ordidance was to secure a continuous and uninterrupted supply of labour. Under this amended proclamation Chinese labourers who wished for a holiday during their term of contract were enabled to obtain leave and take a trip home; only those repatriated at Government expense were debarred from returning to the Rand. Upwards of 1,000 applications were received. A large number of these were dismissed as frivolous and unreal; many more were withdrawn on discovering that a Government-aided passage entailed disability to return to the Rand, with a penalty of one year's imprisonment with hard labour should the offender succeed in an attempt to return; and many other applications were altered, and the money for the fare produced by the applicants, rather than that permission to return should be forfeited. In September, 1906, some 250 coolies were re-shipped to China by the Foreign Labour Department under the amended proclamation above-mentioned. Many of these intended to return.

The position of the mining industry towards the middle of 1906 was that of "marking time," and awaiting developments. The policy adopted was to achieve the utmost amount of mining development possible with the labour available, and to increase, if practicable, the South African native labour supply, also to extend over as long a period as possible the shipment of coolies under licences already obtained until the final decision of the Home Government in respect to the Labour Importation Ordinance should be declared, or until full self-government were granted to the Transvaal Colony. During this period of irritating delay all other commercial enterprise, which in the Transvaal fluctuates with the pulse of the all-important mining industry, also suffered eclipse. Large orders had been expected by many firms, and in numerous instances contracts were awaiting signature, for a huge increase in mining plant and requirements so soon as a sufficient supply of labour had been obtained to work to their highest capacity the properties already producing, and to advance the non-productive mines another stage. The result of the avowed intention of the Home Government to "abolish Chinese slavery on the Rand" was the cancellation of many of these orders and contracts, and a return to the depression from which trade and commerce appeared to be emerging at the end of 1905.

It was computed by the Chamber of Mines that upwards of 6,000 white men would be thrown out of employment by the repatriation of the Chinese. The number of unemployed who had good hopes of employment and who would be disappointed, it was estimated, would be also very large. The amount of local expenditure which would cease as a result of repatriation was placed at over six millions sterling.

In May, 1904, there were on the mines of the Witwatersrand 12,414 European employés. Of these, it is scarcely necessary to explain, a certain number were permanent and unchanging officials. At the same period there were 70,608 native employés. In October, 1905, there were 17,353 white employés in proportion to 87,119 natives employed, and 45,956 Chinese. This number of white skilled workmen does not include those who were under special contract to prepare compounds, or to undertake similar work, nor the staff, conductors, and others under engagement with the Chamber of Mines Labour Importation Agency. Prior to the war the greatest number of natives ever obtainable for the mining industry was 111,000, and the largest number of Europeans employed 13,000. Even then there were not so many stamps being dropped as could have been "in working" were more labour available. It has been the endeavour of the heads of the industry not only to restore the conditions existing previous to the war, but push ahead the development, as even in those days they desired, although they were unable, to increase it.

The Transvaal Chamber of Mines.

THE record of the Transvaal Chamber of Mines is to all intents and purposes a complete history of the mining industry, and (it might also be added) of the political history of the Transvaal since the discovery of the Witwatersrand Goldfields. The mine-owners of these fields had it borne in upon them, very shortly after the inception of the industry, that to secure economic freedom it would be necessary for the common interests and aspirations to be set forth by a common voice; and in 1887 the first attempt at organisation was made. Nothing in the shape of a written account remains of this attempt, save entries touching "debts of the old Chamber," in the earliest reports of the Witwatersrand Chamber of Mines. That it serves its purpose, however, is plain, inasmuch as it paved the way for the formation of the powerful Association which "made history" for the South African Republic, and with which are connected names now familiar in all parts of the British Empire. A realisation of the policy and methods of administration of President Kruger's Government is necessary to make it clear why political considerations assumed from the first such prominence in the deliberations of so purely industrial a body as the Chamber of Mines. The mining industry was treated with hostility, at times active, at times overt, by the Executive authorities, and was regarded with dislike and suspicion by an ignorant people, contemptuous alike of things alien and of things progressive. These feelings were indubitably fostered by the over-increasing number of Hollander and other Continental settlers anxious to ingratiate themselves with Mr. Kruger, and naturally not averse to profit by the existing dread of the bogey of British aggression. Acts of consideration and support for the mining industry on the part of the Government of the South African Republic are recorded at intervals. The leaders of the industry never received these favours without misgiving, and it is to be admitted there was much to justify their suspicions. On the other hand, the often needlessly aggressive tone of the British settlers, their want of regard or respect for feelings and prejudices unshared by them, and the total lack of affection for the land or care for its future—openly expressed and displayed—tended much to widen the gulf between the old population and the new. Tolerated and disliked, bullied and feared, the mining community insisted upon its rights and asserted its position, in season and out of season, entirely regardless of its unpopularity throughout the country, and the enormous increase of revenue accruing to the bare coffers of the State induced a grudging concession as to the usefulness of industrial enterprise, the while it was earmarked for ceaseless and irritating extortions. The early history of the Chamber of Mines is a record of spirited opposition, increasing activity, and an ever-broadening sphere of influence, and the determined stand adopted on all industrial questions almost won respect and secured a less unreasonable attitude from those to whom industry itself was apparently objectionable, and by whom progress was opposed by an immeasurable inertia.

The Witwatersrand Chamber of Mines was definitely formed late in 1889, with a Council of eleven, and 85 members who represented the interests of 50 Witwatersrand mining companies. Meetings were held by the Council, five of the members of which retired half-yearly. In the following year an Executive Committee replaced the Council, and monthly meetings of the general body of members were then held. Articles of association were drawn up, and first published in the annual report for 1890. These set forth the purpose for which the Chamber was organised, and the rules governing membership. It was explained that the Chamber was brought into existence to protect and forward mining interests and the mining industry in the South African Republic, to stimulate public interest in and discussion upon such matters, to endeavour to promote necessary legislative measures affecting such interests, to exchange views and information with other South African Chambers of Mines and Government mining departments and authorities, to secure all available information and assistance in mining matters so as to increase efficiency, to keep watch for new inventions and methods, to keep touch with the other gold-fields of the world, to form and collect a library and museum of mineral specimens, to manage the property and invest or otherwise deal with the funds of the Chamber, and to obtain an Act of Incorporation from the Volksraad of the State at the earliest possible moment. Representative, associate, honorary, foreign, and visiting members were recognised. Any syndicate working a mining proposition, or group of miners concerned in one property, could be represented by one member, on payment of 25 guineas annually. Registered mining companies were entitled to three representatives, the subscription then increasing to 50 or 100 guineas. Not more than three representatives were allowed to any company. Residents in the Republic who were interested in mining matters were eligible for election as associate members on payment of three guineas annually. Honorary members could be admitted by the Executive of the Chamber without subscription. Persons resident abroad were eligible to become foreign members by election, on payment of five guineas annually. Persons visiting the country might be elected as members for three months, on payment of two guineas. The Executive Committee was only to be elected from the representative members, and five members of the Executive constituted a quorum. The election of the Executive was by ballot, and votes at meetings were adopted by a show of hands, the President having the privilege of a casting vote. No member, on retirement or expulsion, was released from his liabilities to the Chamber, neither could he claim further benefit from it. The banking account stood in the name of the Witwatersrand Chamber of Mines. In 1896 the constitution of the Chamber was modified. Only three classes of members were recognised—representative, associate, and honorary. Uniform representation was introduced, and representative membership was limited to directors, consulting engineers, and managers and secretaries of mines. The President and Executive Committee were to be re-elected every year, office-holders to be appointed from the Executive Committee, and no President could hold office for more than two years consecutively. Before these changes were agreed to, much acrimonious discussion took place in

the Chamber's deliberations. A letter, signed by 23 companies, was addressed to the Chamber on January 31st, 1896, demanding these reforms, and in consequence of refusal the protesting companies seceded in March and formed themselves into a body called the "Association of Mines of South Africa." In the following year the reforms were adopted, and in November, 1897, the seceding Association ratified its fusion with the original body, the name being then changed from " Witwatersrand Chamber of Mines " to " Chamber of Mines of the South African Republic." The number of the Executive was increased to fifteen, and 28 new companies joined the Chamber. The reconciliation, and consequent increase of the Chamber's membership and responsibilities, greatly added to its power and prestige, and united the mining interest in one comprehensive organisation. The number of members was then 147. (In 1902 the name and constitution were again altered. The title " Chamber of Mines of the South African Republic " being no longer appropriate, it was changed to " Transvaal Chamber of Mines." Greater powers and authority were entrusted to the Executive Committee.) The President of the South African Republic was elected Honorary President of the Chamber, and was constantly re-elected until the year subsequent to the occurrence of the Jameson Raid. Mr. Christiaan J. Joubert, Minister of Mines, for a corresponding space of time was one of the Honorary Vice-Presidents. Mr. Herman Eckstein was the first President of the Chamber, in which he represented the senior and largest interests on the Rand, his firm being practically the Transvaal branch of the powerful house of Wernher, Beit & Co. Mr. Lionel Phillips next held presidential honours, and was re-elected to the office for several years. The political disorders which culminated in the Jameson Raid terminated his career of presidency, and he was succeeded by Mr. James Hay, who severed his connection with his committee after some 18 months, owing to a difference of opinion with the Chamber as to the nature of his duties while representing the industry on a Commission appointed by Mr. Kruger to inquire into the grievances of the mining community. Monsieur Roulliot next held office, and was President on the outbreak of war in 1899. His legitimate two years of office had expired at the end of 1899, but he continued in the chair during the confusion which ensued throughout 1900. His successor was Mr. (now Sir) Percy Fitzpatrick—a colonial-born gentleman of distinction and ability, who on the Chamber's return to Johannesburg steered it through the troubled waters of military administration, and directed it during the laborious process of re-organising the mining industry. To him succeeded Sir George Farrar, who introduced the Chinese labour policy, and shared the responsibility, as member of the Legislative Council, for the Ordinance which arranged for the importation of coolies to the Rand. Mr. Harold Strange, long associated with the firm of Barnato Brothers, was President of the Chamber in 1904, succeeding Mr. Brakhan, the representative of Messrs. Goerz & Co. During Mr. Strange's tenure of office he represented the mining interests at the Inter-Colonial Conference held in Bloemfontein for the purpose of discussing a general railway policy for South Africa. He also attended the Shipping Freights Conference in Capetown and London in the same capacity. Mr. Drummond Chaplin (of the Consolidated Goldfields) was President of the Chamber in 1905. This gentleman took part in the farewell ceremonies in Johannesburg on the occasion of Lord Milner's departure from South Africa. He officially represented the Chamber at the public reception of Lord Selborne on his arrival in the Transvaal. The duties of secretary to so increasingly important an organisation have called for the energies of a personality of no insignificant calibre. The position has been held successively by Mr. Sheldrick, Mr. J. M. Buckland, and Mr. Goldring. The present holder of the office is Mr. Cowie. Mr. H. E. O. Green was assistant secretary under both Mr. Buckland and Mr. Goldring, but resigned during the war period to take up the secretaryship of the Rhodesian Chamber of Mines. The political environment to which the Chamber had perforce to accommodate itself brought it naturally into contact with the representative for the time being in the Transvaal of the Suzerain Power. It is therefore interesting to recall that since the birth of gold-mining in the Transvaal the British residents accredited to the Boer Republic have been Mr. Hudson, Major Gorges, Mr. Ralph Williams, Sir Jacobus de Wet—with Mr. Henry Cloete (acting)—and Mr. (now Sir) Conyngham Greene. The Mining Commissioners of the Witwatersrand Goldfields were successively Mr. Jan Eloff and Mr. J. L. van der Merwe, under Mr. Christiaan Joubert, who was Minister of Mines in the Boer Government. Since the British occupation the head of the Mines Department has been resident in Johannesburg. The Commissioner of Mines was Mr. Wilfred Wybergh—a mining engineer, who had formerly been president of a loyal British organisation known as the South African League. Sundry divergencies from the view of the Lieutenant-Governor of the Transvaal touching the amending of the Gold Law led that gentleman in 1903 to resign the position, which has since been filled by an acting Commissioner of Mines.

The Witwatersrand Chamber of Mines having called itself into existence in October, 1889, two Councils were elected in quick succession before the second financial year in December, 1890. The first Hon. President of the Council was President Kruger, and the first Hon. Vice-Presidents were the Minister of Mines (Mr. Christiaan Joubert) and Mr. W. Y. Campbell. The first President was Mr. Herman Eckstein; Vice-Presidents, Messrs. R. R. Hollins and Carl Hanau. The Council included, up to the end of 1890, the following gentlemen (some of whom served only for a very short period):—W. Y. Campbell, James Hay, W. Hosken, W. F. Lance, Geo. H. Goch, Geo. Richards, Ed. Lippert, Geo. H. Farrar, H. A. Rogers, W. H. Rogers, J. B. Taylor, Lionel Phillips, F. von Hessert, F. J. Dormer, F. Spencer, J. Ballot, W. Ross, F. C. Liddle, T. M. C. Nourse, and H. L. Currey. Fifty mining companies were represented, these being:—The Aurora, Balmoral, Bantjes Reef, Crown Reef, City & Suburban, Cinderella, Cornucopia, Driefontein, Doornkop, Eclipse, Ferreira, Flora, Gipsy Reef, Goldfields of South Africa, Gardner, Geldenhuis Estate, George Goch Amalgamated, Geldenhuis Main Reef, Henry Nourse Deep Level, Jumpers, Lnipaards Vlei, Langlaagte Block B, Langlaagte United, Langlaagte Estate, Langlaagte Star, May Consolidated, Modderfontein Main Reef, Midas Battery Reef, Nigel, National, New Grahamstown, Odessa, Oriel Main Reef, Randfontein, Robinson, Riet Vlei, Simmer & Jack, Steyn Estate, Stanhope Geldenhuis, Transvaal Montana, Teutonia, Violet, Van Wyk's, White Reef, Witwatersrand, Weltevreden, Moss Rose, Johannesburg Pioneer, and Transvaal Coal Trust. Many of these companies have ceased to exist, and many others have undergone re-construction and absorption. Most of the names of the original members of the Chamber are still familiar in the daily life of Johannesburg, while others, whose owners have joined the " great majority," are held in affectionate remembrance as staunch comrades of the strenuous pioneering days. At the close of 1905 the membership of the Chamber of Mines numbered 169, representing 67 producing gold-mining companies, 63

non-producing gold-mining companies, and eight colliery companies. The number of mill stamps represented was 7,080, as against 5,644 at the close of 1904, and 680 (from 15 mines) at the close of 1901—the year of reorganisation after the interruption caused by the war. In March, 1906, the Robinson group of mines seceded from the Chamber, virtually through dissatisfaction with the methods and results of the Witwatersrand Native Labour Association. The seceders—following the example of the Premier Diamond Mine and a few other independent ventures—started to organise their own recruiting agency for native labour, and launched the "Transvaal Mines Labour Association" for that purpose. Later in the same year permits to recruit were obtained by the new organisation from both the Transvaal and the Portuguese East African administrations; the door was thus re-opened to competitive recruiting amongst the natives, and a situation was created that is being watched by the whole of South Africa with the utmost interest.

In 1894 the Chamber of Mines appointed representatives in Europe to supply the public with information as to South African mining investments. These appointments were held by Messrs. Barsdorf & Sons (London), the Banque Française de l'Afrique du Sud (Paris), and Messrs. Hardy Bros., Berlin. The first-mentioned ceased to act in this capacity in 1903. In 1899 the Chamber rejected a suggestion for incorporation with the London Chamber of Mines, emanating from the latter body.

In 1893 the Chamber of Mines petitioned the Government of the South African Republic to grant an Act of Incorporation, and to pass a special law to enable it to take effect. This petition, accompanied by a suggested Draft Law, was presented to the Executive year after year without avail. No law for such a purpose was to be found in the Republic's code, and the Volksraad viewed the suggestion with the profoundest suspicion, scenting a deep-laid plot to obtain some unknown power or privilege for the Chamber. A definite refusal was received in 1899. After the British annexation the matter was again brought forward, but was postponed by the Executive pending the promulgation of important legislative measures. The Act was finally passed in 1903, being entitled "The Societies and Associations Incorporation Ordinance." In 1904 the Chamber was registered and duly incorporated under the provisions of this Ordinance.

A London office of the Transvaal Chamber of Mines was established in 1903, rendering invaluable assistance to the industry. This office is under the able management of Mr. A. R. Goldring, the third Secretary of the Chamber.

The receipts and expenditure of the Chamber of Mines in 1890 and in 1905 respectively were as follows:—

	Receipts.	*Expenditure.*
1890	£ 4,096	£ 3,473
1905	19,038	22,156

In 1905 the constitution of the Chamber was amended, and the annual subscription was increased by reason of the expenditure having for several years exceeded the income. The subscription was raised from 100 guineas to 125 guineas—the change to take effect in 1907.

Detailed statistics as to the work and production of the other goldfields of the Transvaal have been published by the Chamber of Mines. In the pages of its annual reports are to be found the fullest accounts of the workings and returns of the De Kaap, Lydenburg, Klerksdorp and Potchefstroom, and other fields, as well as exhaustive discussions on new methods and chemical processes of dealing with mineral matter. The Consolidated Goldfields of South Africa, under the personal influence of Mr. Cecil Rhodes, was largely responsible for the introduction of American methods, and American engineers, on the Rand. This has undoubtedly made for efficiency, although the counsels enlisted have not always conduced to harmony and political unity. One of the best-known of these gentlemen was Mr. L. I. Seymour, who ardently espoused the British cause during the period of hostilities, and acted for the house of Eckstein in raising a corps of Rand mining men, known as the Railway Pioneer Regiment, for service in repairing bridges, culverts, and railway lines. Mr. Seymour was killed in action at Sand River, in the Orange Free State (now the Orange River Colony), while defending an attack on the bridge there. His memory has been perpetuated by a handsome addition of technical works, constituting a valuable reference library, contained in the building of the Public Library of Johannesburg, and his portrait hangs in the board-room of the Chamber of Mines, opposite to that of Mr. Herman Eckstein, the first President of the Chamber, whose death occurred during his tenure of that office.

The Rand in the early days of its exploitation experienced the wild excitement and depression, the over-speculation and its inevitable nemesis, the worthless flotations and questionable practices, common to all mining camps, and the brand of all communities of adventurers not controlled by public opinion and a corporate tradition. Nor, in the case of the Witwatersrand, was there wanting the stern criticism that pointed the moral to the disillusioned investor in Europe. It is instructive to read the wholesomely outspoken warning addressed by the British Resident at Pretoria, Mr. Ralph Williams, to the newly-organised Chamber of Mines in 1890, concerning the evil effects of the industry's sins of omission and commission, and of the obvious lack amongst the miners of any real concern in the land or its development. These accusations were, of course, warmly repudiated by the Chamber, the representative of new residents who, after all, could scarcely be expected to take a truly cordial and altruistic interest in a country the population of which boasted continually that it was purely pastoral and agricultural (which population, however, made no serious effort to produce locally the foodstuffs so keenly in demand, but insisted on levying thereon heavy taxes in addition to the enormous cost of importation). Another candid friend arose in Mr. W. Y. Campbell, a public-spirited Natal colonist, who was despatched by the Chamber of Mines on a special mission to the United Kingdom. After spending time and energy in lecturing on the industry and conditions of the Rand, in persuading the investing public to view more intelligently and sympathetically South African investments, that gentleman on his return described public opinion in Great Britain as having been quite as deeply incensed against the mining community by reason of its disingenuous "market" transactions as against the Boers on account of their political pretensions and obstructiveness.

Almost from the date of its origin, the Chamber of Mines found itself confronted with problems which were not only of vital import to the industry, but which had a very much wider bearing on the development of the whole country. The earlier reports of the Chamber's proceedings are largely made up of petitions to the Executive and Volksraad, and of tedious interviews, correspondence, and contro-

versies with one or other of the State officials. Occasionally persistence was rewarded with some small success; usually, however, the result was a curt refusal or an invincible inertia. In one or two rare instances reason and justice gained the day, and some of the most enlightened and popular pieces of legislation adorning the Transvaal code were the result of the initiative and persistence of the Chamber of Mines—a body then, as now, frequently represented as seeking nothing so much as to steal away the liberties of the people. In its relations with the Boer authorities a tone of anxious courtesy appears to have prevailed, and all the proper compliments and formalities were carefully observed. On the occasions of President Kruger's rare visits to the Rand he was invariably approached by deputations from the Chamber, which he did not fail to entertain as courteously as it was his nature to do. When a certain rowdy section, after the State President's address at the Wanderers' Pavilion on the occasion of His Honour's second visit to Johannesburg, indulged in some offensive display of hostility, a becoming apology was forthcoming from the Chamber. The ebullition alluded to was provoked by the expression of the President's railway policy, elicited by a deputation from the Chamber to urge their views upon the railway question.

The first united action taken by the Chamber of Mines on behalf of the general public was in connection with a threatened shortage of food in Johannesburg in 1889-90. Supplies were collected and conserved, and the Government was successfully petitioned to remove temporarily the special duties on imported meal and flour. The Government further gave a sum of £5,000 towards the relief of the prevailing distress. This sum was spent in bonuses to the transport riders who brought up the first 250 wagons to arrive with foodstuffs on the Rand, with their spans of oxen in good condition. Serious distress was averted by this timely action. The salaries of the State Judiciary were raised in response to an appeal from the Chamber, so that judges might be placed in a position more befitting their important duties. A State Mining Engineer was appointed as the result of another effort of the Chamber. Mr. Klimke, an Austrian mining engineer of high standing, received the appointment, and Mining Inspectors and other officials, constituting a most efficient and enlightened department, were placed under his control. Mr. E. P. Rathbone (a prominent authority on mining matters), Mr. M. Franke (now joint manager for Messrs. A. Goerz & Co.), and Mr. Schmitz-Dumont (late manager of the George Goch mine—who fell in action at Spion Kop), were members of Mr. Klimke's staff. The sanitation and water supply of the Rand, and the necessity for increased authority for the local governing body, also were subjects represented by the Chamber of Mines, as was the necessity for the vaccination of natives, and for a segregation hospital for smallpox patients. Two epidemics of this disease were combated during the nineties; lymph was imported, and the Government was induced to build and equip a lazaretto. The unscrupulous conduct adopted by some of the police and *veld-kornets** in outside districts towards natives was a frequent subject of remonstrance to the Government. The Gold Law, as finally evolved—a liberal, popular, and well-considered piece of legislation, on the whole—owes much of its excellence to suggestions and advice of the Chamber, which subsequently undertook the important duty of codifying the measure. This work, however, was never acknowledged by the Volksraad, nor was the law in its most improved form ever enacted. With the strained relations existing between the uitlander community and the Boer Government, after the futile attempt at revolution in 1896, further co-operation with the Executive was not attempted. The Volksraad rejected the suggestion that the Minister of Mines should occupy a seat on the Chamber's Executive Committee, and a Commission on the amended Gold Law, in which the Chamber was represented by Messrs. Roulliot and Brakhan, failed to achieve any practical results. In 1899, other (and undesirable) amendments to the Gold Law were introduced, and were put into enactment in spite of the vehement opposition of the Chamber of Mines. These new regulations gave the Government special powers of interference with, and confiscation of, the business and properties of mining companies. After the establishment of British rule the Gold Law again came under discussion, and public excitement was very strongly aroused at the prospect of fundamental alterations. Sir Richard Solomon, then Attorney-General, was responsible for these alterations, in which the Lieutenant-Governor concurred; and the resignation of the Commissioner of Mines became necessary. Unfortunately this official had taken up an attitude in favour of the employment of white unskilled labour on the mines, which was popular with neither employers nor employed, and his resignation evoked little sympathy for him in mining circles. The Gold Law was hotly debated in the Legislative Council—a nominated assembly in which the Chamber of Mines was well represented. The result was practically a defeat for the Attorney-General, the matter being referred to a Special Commission, and then "shelved" until such time as self-government were granted to the Colony. Much irritating delay, loss, and inconvenience has been caused to the public by this long period of suspense. The Chamber of Mines has greatly advanced the public interests by its steady opposition and expostulation in regard to the practice of granting concessions and monopolies, so freely and disastrously indulged in by the Boer Government. After persistent effort, endless petitions, and unwearying patience, the Chamber wrung from the Boer Administration an admission that the system was opposed to the national welfare, and would be no more countenanced. After the Raid, however, the evil revived. Sir Percy Fitzpatrick, in his book, "The Transvaal from Within," gives a list of the "concessions, privileges, and contracts proposed or agreed to" for 1899, from the official lists, which embraced dynamite, railways, spirits, iron, sugar, wool, bricks, earthenware, paper, candles, soap, calcium carbide, oil, matches, bottles, and jam. How persistently the defeated applicants returned to the charge may be inferred on comparing this list with the following one, from an earlier year, in which all applications for concessions had been refused, in a sudden attack of administrative righteousness:—Paper, supply of water from the Vaal River, transmission of power by electricity, manufacture of bread, cakes, sweets, and jam by machinery, working of stone by machinery, manufacture of woollen stuffs by machinery, lead and lead compositions and white lead, rope and cord, paper mills, photo-mechanical block printing process, lead pipes (for five years), manufacture of soap and candles by machinery, furniture (for ten years), clothes, matches, sulphur, and paints: all these were included in the monopolies applied for. Other concessions complacently demanded included sole rights of smelting minerals, smelting refractory gold ores, manufacture of gasolene and oil, the right to recruit native labourers, to retail cyanide of potassium, and other monopolies too numerous to mention. These had all to be categorically opposed, while at the same time the

* The *veld-kornet* occupies a semi-military position of authority in his Ward.—ED.

Chamber kept up a relentless crusade against those already in existence—railways (both main and local lines), trams, water supply, coal cartage, dynamite, telephones, the issuing of native passes and permits, the issuing of sundry licences, and the manufacture of spirits. One of the most important matters undertaken by the Chamber was the action against the McArthur-Forrest patent, owned by the African Gold Recovery Co., Ltd., for the treatment of gold ore by the cyanide process. During Mr. Campbell's visit to England the McArthur-Forrest invention, then still in its infancy, was beginning to attract attention. When it was introduced on the Witwatersrand it was so protected by its British patent as practically to permit of a monopoly, and the Boer Government presumably was not inimical to a monopoly imposing an additional burden upon the refractory mining community. The Chamber of Mines challenged the validity of the patent in the Transvaal, and a test case was instituted in the High Court. Delay and difficulty of every description sprang into existence to a degree remarkable even under the Pretoria oligarchy, Mr. Kruger making no secret of his sympathies with the holders of the patent. Proceedings were protracted for some years, and efforts were made to obtain some decree in the Volksraad by which the action taken by the Chamber might be rendered futile. The Judiciary of the Republic threatened to resign should the decision be taken out of their hands, and the President left no stone unturned to wrest it from the High Court. Eventually the case resulted, in 1896, during Mr. James Hay's presidency of the Chamber, in a triumph for the popular cause. The case had far-reaching effects. The cyanide process had been adopted all over the world, and the decision of the Transvaal High Court assisted very materially in the monopoly of the McArthur-Forrest patentees being challenged and annulled elsewhere. The matter was re-opened, so far as South Africa was concerned, in 1902. The patentees, after another adverse decision in the Courts, appealed to the Privy Council, which dismissed the suit with costs in 1904. Thus the case of James Hay *versus* the African Gold Recovery Co., Ltd., was finally disposed of, and the thanks of the Chamber of Mines to Mr. James Hay were again formally recorded.

All these crippling impositions, with certain special taxation, special import duties on meal and flour, on lead, on cement and building materials, and with the heavy licences payable on stands and claims, placed an enormous burden upon the community of newcomers. The Government, in return for the many exactions, did little or nothing for the convenience or well-being of the community, disregarding their claims to citizenship, and obviously treating the gold industry merely as a means of raising revenue. The total revenue of the Republic in 1886 was £308,387. In 1889 it had increased to £1,577,445, of which £1,260,000 was derived, directly and indirectly, from the goldfields of the Witwatersrand. Large sums were lavished on public buildings, and on the relief of poor burghers or "bywoners," who would not work, but to beg were not ashamed. Numbers of these dependent and improvident families were collected in parts of Johannesburg and Pretoria, where townships were laid out and holdings provided for them at the State expense (or, rather, from the pockets of the industrial workers). These burgher settlements rapidly degenerated into purlieus of the vilest description, and remain a standing monument to the futility of indiscriminate charity.

Some of the most energetic of the Chamber of Mines work in the early days was devoted to the railway question. The Netherlands South African Railway Company held a monopoly for railway construction and coal cartage in the Transvaal, and a small local line to serve the mines (running through their areas without any regard for the convenience of the various companies that required coal, provisions, and such like) was a source of endless disputes. Routes were laid and sites expropriated without consulting owners or in any way compensating them for the rights thus infringed. Railways in themselves were strongly disapproved of by the burgher population, inasmuch as they constituted an unfair sort of competition with the farmers' carrying trade by ox-wagon. Even the meagre relief afforded by the inadequate local line was begrudged, and the scheme would not have received sanction, even in so stunted a form, had not the Netherlands concessionaire company hit upon the expedient of terming the line a "steam tramway." It was known as the Rand Steam Tram for some years. The whole railway policy of the Republic was in the direction of retarding development until Mr. Kruger was able to conclude his long-desired bargain with the Portuguese authorities for a special tariff over the Delagoa Bay railway, and nothing was done until this question was settled, in the fear that the British Colonies might secure some unforeseen advantage. The cost of transport by wagon from the railway termini of the Cape Colony and Natal was approximately 30s. per 100 lbs.; the estimated cost by rail at the existing rates would have been 8s. per 100 lbs. It was calculated that during three and a half years upwards of £5,000,000 was paid to white and native carriers other than inhabitants of the State. This sum was therefore a dead loss to the people of the Transvaal, as well as to the mining industry. The N.Z.A.S.M. (Nederlandsche Zuid Afrikaansche Spoorweg Maatschappij Beperkt) also levied rates that were burdensome in the extreme, being, in connection with those of the Portuguese line, double, and sometimes more than double, those charged by the other trunk lines of South Africa. On the local line known as the Rand Tram the rates for coal cartage ranged from 2·92d. to 2·08d. per ton per mile. The freight charged upon coal from the collieries of Brakpan and the East Rand to Krugersdorp and the West Rand was 7s. 11d. per ton; from Springs collieries to Krugersdorp 8s. 10d. per ton. The receipts of the N.Z.A.S.M. during 1895 totalled £1,550,071, the working costs being £668,297. To increase these profits, the Vaal River drifts (fords) were, by Government order in 1895, closed to wagon traffic. This caused an angry protest from the uitlander community, and the Chamber of Commerce of Johannesburg called upon the Chamber of Mines to support it and the Mercantile Association in a joint expostulation. No notice whatever of this agitation was taken by the Government. The matter finally was referred by the British community to the Colonial Office, and the obnoxious proclamation was declared to be a violation of the London Convention, and was withdrawn—not, however, before trade had suffered greatly, and merchants had endured heavy loss, through the temporary dislocation of traffic and the inability of the railway to cope with the congestion.

On the educational question, the attitude of the Republican Government was most intolerant. British parents had no facilities for securing for their children a decent education, so a Council of Education had taken the matter in hand on behalf of the uitlander community. The Chamber of Mines supported the efforts of the Council, and presented a scheme for the consideration of its members, by which the children of white employés might receive sound instruction in

English. Subscriptions, in proportion to the number of white men working, were to be raised, nine companies each contributing £1,000, eight £600, eleven £450, thirteen £350, fourteen £150, seventeen £100, fifteen £75, and four £25 each. In this manner a sufficient sum would have been raised to assist the Council of Education in establishing schools for the children of the British population along the Witwatersrand. Unfortunately, however, the political disturbance caused by the Jameson Raid temporarily dislocated all enterprise, and at a later date the necessary sum was subscribed by members of the London branches of Rand mining houses. In 1899, again, a scheme was proposed by the Chamber to raise a further sum for the assistance of the Witwatersrand Council of Education, but a fresh political crisis intervened, and the scheme came to nothing. Under the British administration education in the Transvaal owes much to the Chamber of Mines. The Witwatersrand Council of Education, the Town Council of Johannesburg, and the Chamber of Mines gave large donations to supplement the necessarily inadequate sum which the Crown administration was able to spare for secondary and technical education. An amount of £100,000 had been handed over to the Council of Education as a contribution from the mining industry, and further sums were forthcoming, in addition to the grant of sites along the Reef for Government elementary schools. A bacteriological laboratory, under Government control, and a Transvaal Technical Institute were founded, and endowed with these moneys. With the last-mentioned institution was amalgamated the Kimberley School of Mining, and later on it benefited largely under the will of Mr. Alfred Beit. It is now known as the Transvaal University. The valuable and extensive collection of mineral specimens, fossils, and curiosities which originally formed the museum of the Chamber of Mines, together with the large number of valuable specimens placed in the care of the Chamber's curator by the Transvaal Geological Society, was handed over to the University. The museum contained one of the most instructive and best-arranged mineralogical collections to be found south of the Equator, having been substantially augmented by exchanges with other museums, as well as by gifts from members of the Chamber and of the professions allied with the mining industry — amongst whom may be mentioned Messrs. J. Ballot, David Draper, E. P. Rathbone, and C. E. Wilson Moore.

In 1896 the question of hospital accommodation engaged the attention of the Chamber, the Central Johannesburg Hospital being found inadequate to the needs of the entire Rand. A scheme was discussed with the S. John Ambulance Association for "first aid" assistance and instruction along the Reef, pending the consideration of the installation of properly-equipped mines hospitals. The Present Help League, an organisation for the relief of sick and destitute persons, received an annual contribution from the Chamber's funds for a number of years. Much distress began to prevail in Johannesburg, and became more acute after the Raid. The Help League was started in 1893, and continued its work until the outbreak of war. It is a common fallacy amongst the latest arrivals, the ignorant, and the thoughtless, that British rule is responsible for the depression on the Witwatersrand in the first years of the century, but the facts entirely dispose of such. Dr. Leyds gave it as his opinion, years before the war took place, that the chief cause of poverty on the Rand was overcrowding, as, even then, a larger population had accumulated in Johannesburg than the place was capable of accommodating. At the time of the Jameson Raid, when it was anticipated that warlike disturbances would occur in the town, large sums were voted by members of the Chamber of Mines towards laying in a stock of provisions for the townsfolk. During the war, and for quite six months before its commencement, the Temporary Relief Fund, which gave assistance to destitute British and Dutch alike, and provided free passages to the coast to refugees from the seat of war, was financed mainly from the same sources. This fund continued its relief operations in the coast towns for many months. Early in 1896 (immediately after the Jameson Raid) a lamentable disaster, causing great loss of life, occurred through the accidental explosion of two trucks of dynamite which were standing in the Braamfontein railway goods station. The result of the explosion was the laying waste of a large area of the poorer burgher and coloured quarters. A movement for the alleviation of the distress entailed by this terrible occurrence was initiated with the utmost promptness by the Chamber of Mines and its members, and within a few hours no less a sum than £80,000 was raised by them for this purpose, although the sufferers by the disaster were mainly Dutch, and the accident was due to the carelessness of the Government's officials, and the hostile dynamite monopolists' own servants. The inquiry into this disaster led to improvements in the method of conveying and storing dynamite on its way from the factory to the mines, which had long been urged by the Chamber of Mines. In 1905 it was again brought to the notice of the Government, by the Chamber, that portion of the road from the factory at Modderfontein was in a dangerous condition, and in consequence a bridge was at once constructed by the Public Works Department, and opened for traffic in a short time.

It has been shown that many of the wisest and most popular laws enacted by the Republican Government—which by its admirers is still spoken of as having been inspired by great natural ability and statesmanship—were suggested and drawn up, or amended, by the well-abused mining houses and their following. The Pass Law, amended and modified by Sir Godfrey Lagden, still remains on the statute books, as does the Gold Law. These, and the courageous fight against concessions, the successful action against the monopoly of the Mc Arthur-Forrest patentees, the improvement of sanitation, the defence of local governing rights, and the support of charitable, educational, and hospital work, are among the many benefits conferred on the public and the country chiefly on the initiative of the Chamber of Mines.

The Chamber of Mines entered into its own offices in November, 1894. This handsome building is situated on the south side of the Market Square, between Harrison and Simmonds-streets, Johannesburg, and was specially designed and erected for its present purpose at a cost of some £18,500. The staff of the Chamber itself, together with those of its subsidiary departments for Native and Foreign Labour, are accommodated in it, and find the accommodation none too roomy. The library of technical works gradually collected has now, augmented by gifts from members, been added to the Seymour Memorial Library in the building of the Johannesburg Public Library.

The political disturbance which culminated in an abortive invasion of the territories of the South African Republic in 1896 had its root in the State President's refusal even to consider the petition (presented in 1894) of 35,483 uitlander citizens to participate in the franchise. The seething discontent evoked by galling and inadequate administration, and by heavy taxation without representation, asserted itself in an attempt at armed rebellion, the

preparations for which extended over months, and culminated in December, 1895. The leaders of the mining industry were deeply involved. The Reform Committee, head and front of the conspiracy, was organised by Mr. Lionel Phillips (President of the Chamber of Mines), representing Eckstein's; Colonel Rhodes (the representative of the Consolidated Goldfields of South Africa), Mr. (now Sir) George Farrar, and Mr. J. Hays Hammond. On the collapse of the plot consequent on Dr. Jameson's precipitate and inexplicable advance into the Republic, followed by his defeat and capture at Doornkop, these gentlemen and their friends and associates in mining and professional circles in Johannesburg, to the number of sixty, suffered incarceration in Pretoria Gaol. Even in the midst of the confusion and dismay in which the utter failure of their plans involved them, it is noteworthy that the task of assisting the unarmed townspeople to meet the situation, and the devising of means for their protection in case of riot or disorder, was their first consideration, in spite of the fact that their own persons were in imminent danger from the angry Boers, and from the infuriated populace (who persisted in the belief that Dr. Jameson had been betrayed by those whose "tool" he was). Supplies were bought, arms were served out, and emergency police corps organised, drink-shops closed. The town was practically taken over by the uitlanders, and the strictest order prevailed. Many mines stopped working, and the miners went into Johannesburg to give their assistance.

The most discreet silence is preserved in the records and reports of the Chamber of Mines as to all these happenings, and the dislocation of business, and heavy expenditure, consequent upon them. Most of the prisoners, charged with treason against the State, were released on bail of £2,000 each, after upwards of a fortnight's imprisonment. Some were liberated on £4,000 bail. The four leaders, and the secretary to the Reform Committee, were not admitted to bail until later. The terms then were £10,000 personal security each, deposited in cash, and the costs, which amounted to £1,000 per month, of their living under police surveillance in Pretoria. The would-be "Reformers" were tried for their lives on the charge of high treason in the High Court, before a Judge specially imported from a neighbouring State, and by rules unprecedented in the history of civilisation. The four leaders were sentenced to death, others of the Reformers to banishment from the country, or to abstention from any interference in politics for three years, and in addition mulcted in heavy fines. From the four leaders (whose death sentence was afterwards commuted, and who were released, after endless intrigues and "shufflings") Mr. Kruger obtained £100,000; the lesser fines of the sixty confederates amounted to £112,000. The worst part of the punishment was the detention in the unspeakable atmosphere of the gaol precincts in Pretoria, where neither humanity nor common decency were in any way represented; but the capitalist leaders bore their fate with dignity and courage. Some months later, an Industrial Commission was appointed by the State President to inquire into the conditions and causes of the dissatisfaction on the goldfields. This step might have led to admirable results, for the members of the Commission were men of integrity and determination, and conducted their inquiry in an admirable spirit of fairness. Mr. Schalk Burger (a member of the Executive Council of the State) was Chairman, and was supported by Mr. J. S. Smit (Railway Commissioner), Mr. Christiaan Joubert (Minister of Mines), Mr. Schmitz-Dumont (Acting State Mining Engineer), and Mr. J. F. de Beer (First Special Judicial Commissioner, Johannesburg). Mr. T. Hugo, General Manager of the National Bank of South Africa, was financial adviser to the Commission, and other advisory members were nominated by the Government. One of these members was Mr. James Hay, President of the Chamber of Mines, and his office was resigned by reason of his disagreement with the Chamber as to the attitude he should adopt in regard to the Commission. He considered that he should rather regard himself as a member of the Commission than be specially required to watch the interests of the industry. Evidence before the Commission was given on oath. The report, when published, made a favourable impression on the mining community, who had not expected any satisfaction from a Government inquiry. Mr. Kruger and a majority of the Volksraad, however, indignant that any abuse or grievances should be admitted as having existence, handed over the report to a Special Committee for consideration. The result was in effect to emasculate the Commission's work and stultify its decisions, and the mining community received the bare satisfaction of having their grievances admitted and categorically placed on record by a thoroughly competent and trustworthy body of men—who were also, strange to say, highly-placed officials of the Boer Government.

The final visit of President Kruger to Johannesburg took place in February, 1899. In September, 1899, it became apparent to all but the most incurable optimists that war was inevitable. An assurance was asked for by the Chamber of Mines that the mining industry would not be interfered with, and that the mines might continue to work and to export their gold, if the inevitable came to pass. A deputation from the Executive Committee of the Chamber of Mines interviewed the State President, who refused to give any such assurance. It was subsequently notified that no British subjects would be allowed to stay in the country after the outbreak of war unless supplied with permits to remain at their employment. The mining companies therefore applied for permits for employés, and promised bonuses to those who would remain at their posts as long as possible. Every step was taken for the protection of life and property, and all mining premises were stocked with supplies. Efforts were made to provide that at least the pumps could be kept working, and the mines kept dry and accessible. The Acting State Engineer then demanded from the Chamber a complete return of all supplies, explosives, and other material which the mining companies had in hand. After the commencement of hostilities most of the articles stored were "commandeered." Another deputation was despatched to Pretoria to demand protection for mining properties. Commandant-General Joubert gave little satisfaction on the specific points raised, but afterwards a Government proclamation promised protection to all miners, and other British subjects who might be granted permits to remain in the country, provided they took oath to behave in a peaceable, orderly fashion, and with the strictest neutrality. It was announced that all gold produced from the mines would be handed over to the Government for safe keeping. Such of the Chamber's documents as could be spared were despatched to Capetown, and other records and papers were lodged with the Chamber's bankers in Johannesburg. On September 28th, 1899, the last committee meeting of the Chamber on the Rand was held. For about a year regular meetings were subsequently (during the ensuing hostilities) held in Capetown, and the annual report—necessarily rather curtailed—was published as usual, although rather late in the year. This particular report is prefaced by a statement of

the circumstances and conditions under which the properties of the mining companies represented were abandoned, with as accurate an account of the work being then performed, and the conditions the mines were undergoing, as it had been possible to compile. Some few mines never actually discontinued work: others worked on for a time; others, again, were worked by the Government—the British miners leaving the country on hearing of Lord Milner's proclamation that those British subjects whose labour benefited the Republican Government were liable to be regarded as rebels. The Chamber of Mines report of 1899 contains no records of figures that can be relied upon later than those of September of that year. Some few of the Chamber's members who were not British subjects, or who represented non-British interests, and some subordinate representatives of the big mining houses, remained in Johannesburg throughout the period of hostilities. A special force of Mines Police, mainly composed of Germans, was enrolled by the Government, and but little wilful damage was inflicted on mines property up to the time of the British occupation. The incursion of large bodies of troops, and the desultory warfare which continued to be waged for months in the environs of the various towns, entailed, however, a considerable amount of damage. The headgears and buildings of some of the mines on the East Rand were burnt by marauding commandos whose only aim was to commit wilful damage to property. In 1900 the Committee of the Chamber of Mines arranged for a certain number of representative members — consulting engineers — to be allowed to return to the Rand. Arrangements were subsequently made for the enrolment of a special corps of Mine Guards. Early in May, 1901, the Meyer & Charlton, Treasury, and Robinson mines re-commenced work and dropped 50 stamps each, and at the end of the year fifteen mines were running with 680 stamps. Lord Kitchener attended the opening ceremony on the first of these mines being re-started, as the guest of Mr. George Albu. On the resumption of operations, difficulty was encountered in securing labour. Many of the mines' best employés were serving with various irregular corps, which Lord Kitchener was unwilling to disband, nor was the Commander-in-Chief prepared to sanction the employment of men already discharged, at the old rates of pay, as that would cause discontent among those still in the field. It was therefore arranged that the men working should receive the 5s. per day given to Volunteers in the field, and that the remainder of their pay should form a fund from which their wives and families, equally with those of mining men still serving under arms, should profit. The arrangement was not popular, but was carried out. An action was instituted to recover the gold "commandeered" by the Boer Government. It was adjudged, however, that this gold was not recoverable, as the Boer Government had acted within its rights according to the laws of the Republic. In a subsequent action brought, raw gold still in the State Mint was declared recoverable, and the mining companies were called upon to make good their claim to this. A Commission was appointed to inquire into the claims of the holders of concessions granted by the Government of the South African Republic, and Mr. Advocate (now Justice) Curlewis held a watching brief for the Chamber of Mines on behalf of mining interests. The matters of the most urgent import first to receive the attention of the Chamber on the re-starting of the mining industry in 1901 were: Native labour, the supply of requirements to the mines, the return of mine employés, and the return of refugees from the coast. In regard to native labour, the time was judged suitable for an attempt at reducing native wages simultaneously throughout the gold-fields, wages having risen enormously —even before the war—owing to the malpractices of unscrupulous native labour touts, and the ill-advised rivalry between mines which resulted in managers bidding against each other for the services of natives. The natives, moreover, had become further demoralised by military employment and pay, so the supply of labourers was not forthcoming, and the reduction of wages proved in the end an expensive experiment for the mines. The need for unskilled labour was so pressing that the importation of Chinese coolies was eventually decided upon. Mr. Ross Skinner, a mine manager of ability and experience, with Mr. Noyes as his secretary, was despatched by the Chamber of Mines to America, China, and the Federated Malay States, to obtain information as to the possibilities and conditions of Chinese coolie labour. Mr. Skinner's able and comprehensive report paved the way for the Labour Importation Ordinance of 1903. In regard to the return of refugees from the coast, which was delayed in an inexplicable manner, the Chamber of Mines joined with the town of Johannesburg in remonstrating with the High Commissioner. Members of the Chamber were included in a deputation to Lord Milner, and refused subsequently to allow themselves to be nominated to a charitable committee (to raise funds for the assistance of these refugees at the coast) as a protest against his decision that British refugees must not expect Government assistance. Opinion was practically unanimous in Johannesburg and on the mines, and proved too strong for the High Commissioner to ignore. A Government department was then created to facilitate and organise the return of refugees. All the members of the Chamber of Mines who were of other than British nationality stood staunchly by the town in this matter, and no distinction, subsequently, was made between British refugees and those of other nations.

The Chamber of Mines participated in the reception of Mr. Joseph Chamberlain on his visit to South Africa in 1903, having previously appointed a committee of consulting engineers to draw up a statement setting forth the position of the mining industry and the economic questions in connection with it. This was undertaken in view of the fact that Mr. Chamberlain admittedly intended to consider the question of the contribution payable by the Transvaal Colony towards the Imperial war debt. In regard to that contribution, Sir David Barber's report as to the economic conditions of and the amount likely to be forthcoming from the two new Colonies had been published in 1902, and had caused grave misgivings to be entertained by the industrial community in the Transvaal, inasmuch as it saw itself, as heretofore, the milch cow from which the national exchequer was solely to be repleted. In this report the Orange River Colony was declared to be practically on the verge of bankruptcy (a point of view not justified by events); the terms of the Vereeniging compact precluded any contribution being extracted, either for the war debt or for the revenue, from the agricultural population; and there remained, therefore, the resources of the Witwatersrand alone for the Imperial Government to draw upon. The Chamber of Mines thereupon addressed a strong protest to the High Commissioner, setting forth the extreme injustice of imposing fresh burdens upon the one industry of the country, on which the new Administration had already imposed a tax to the extent of 10 per cent. of the profits of the gold mines. It was pointed out that neither the heavy taxation nor the high cost of living in the Transvaal had been reduced—indeed, the cost of living had never before been so high. In spite, however, of misgivings and

protests, Mr. Chamberlain was welcomed with much effusion, and, in an outburst of enthusiasm (subsequently, perhaps, rather repented of), the leading representatives of the mining industry and Chamber of Mines pledged themselves to a war contribution of 30 millions sterling to the Imperial Exchequer—ten millions of which was to be forthcoming so soon as the national finances were in a more settled condition. Part of this sum was to be devoted to internal development in the Transvaal. The war contribution has never been called in by the Imperial Government, partly because the country, struggling painfully back to tranquillity and prosperity, has not yet been in a condition to contribute so burdensome an amount out of its sole source of wealth, and partly because of the purely personal nature of the guarantees securing it—although (in answer to repeated questions addressed to him on the subject in the House of Commons) Mr. Chamberlain earnestly upheld the genuine nature of the agreement with the Rand capitalists. At the same time, public opinion in the Transvaal challenged the right of these gentlemen to enter into such an agreement without some kind of a mandate from the people out of whose pockets the contribution would eventually be paid. An arrangement was proposed, in 1906, by the Liberal Government, through Lord Selborne, by which the war contribution should be reduced to four millions sterling, to be allocated to various phases of internal development and settlement in the Transvaal. Perhaps this will be found to be a satisfactory conclusion to an episode that should never have occurred.

The attitude of the British Administration under Crown Colony government was much more sympathetic to the mining industry than had been that of the Government of Mr. Kruger. Members of the Chamber of Mines who were of British nationality were taken into consultation, on matters of import to the country, by the High Commissioner and his officials. Several leading members of the Chamber were nominated to seats in the Legislative Council, and became responsible for some of the new ordinances placed on the statute books. In these improved circumstances the Chamber no longer had to organise the incessant petitions, deputations, and interviews, which had, under the old *régime*, occupied so much time and been productive of so little good. Nevertheless, the work of the Chamber continued to increase, especially in the direction of improved sanitation and accommodation for unskilled mine labourers—matters which were no longer left to the discretion of mine managers and owners, but were regulated by Government ordinances, and received Government supervision. The upkeep of roads was given special attention. The water supply of the whole Witwatersrand community, also, was delegated to a Water Board endowed with large powers. In these matters the Chamber co-operated with the municipal authorities of Johannesburg as well as with the Government, the necessary outlay in certain directions being shared between the three sections of the community interested—official, municipal, and industrial. The water supplies and general sanitation of the mines passed into the hands of the municipal authorities of Johannesburg, and a comprehensive scheme for hospital accommodation for the Rand was harmoniously arranged. Co-operation also existed in educational matters.

The Chamber of Mines took a part in the farewell ceremonies to Lord Milner, and in those which celebrated the arrival of his successor, Lord Selborne. The Chamber, ever since its inception, has supported and has sent exhibits to most of the industrial and international exhibitions that have been held during its existence, in all parts of the world, and it has taken a keen and watchful interest in any movement or invention that could affect mining matters. It may be claimed, therefore, that the Transvaal Chamber of Mines has fully justified its existence, both in public affairs and in those affecting purely industrial conditions.

The Chamber of Mines and Native Labour Matters.

Undoubtedly the most perplexing and gigantic problem with which the Transvaal Chamber of Mines has ever found itself called upon to deal has been that unique South African difficulty, the native labour question. Many Commissions have from time to time been appointed for the purpose of considering this question in the various South African Colonies, and members and representatives of the Chamber of Mines have given valuable evidence, from the economic standpoint, before all of them. A system to combat the evils and difficulties of indiscriminate recruiting of mine labour was devised by the Chamber, when the Rand Native Labour Association, organised in 1893 with Mr. William Grant (Commissioner of Native Labour for the Chamber of Mines) as manager, was constituted a limited liability company, of which members of the Chamber of Mines held the shares. The object of the formation of such an institution was to obviate the many and glaring evils which the actions of a large irresponsible body of independent native labour touts, often of most unscrupulous character, had introduced into the system of supplying natives for mine labour. The mine-owners were often the victims of extortion, and the natives also were cheated and fleeced, and thereby rendered unwilling to engage themselves for work on the Witwatersrand. Mr. Erskine, successor to Mr. Grant in 1897, introduced many improvements in the methods of the Association. On the resumption of mining activity in 1901, subsequent to the termination of hostilities in the country, the company was placed upon a new footing, with enlarged scope and powers under the able chairmanship of Mr. Harold Strange, and was re-named the "Witwatersrand Native Labour Association." Its work was encouraged and fostered by a sympathetic administration, and facilities were granted by the Colonial Office for entering into arrangements with the Governments of other British African territories and of the Portuguese Provinces for the recruiting of native labour for the Rand mines. The agents of the Association, when these negotiations proved successful, were the sole recognised recruiting agents, and acted in harmony and in co-operation with the officials of the Native Departments of the States in which recruiting operations were carried on. The Board of Management of the Association consisted of members of the Executive Committee of the Chamber of Mines. In 1902 a salaried chairman was appointed, the gentleman who accepted the appointment being Mr. F. Perry, who resigned the position of Imperial Secretary to Lord Milner to accept that offered to him by the Chamber. Mr. Perry combines with his duties in connection with native labour those of Chairman of the Labour Importation (Chinese) Agency. The general manager of the Witwatersrand Native Labour Association is Mr. F. Y. M. Macfarlane. The offices of the Association occupy the ground floor of the Chamber of Mines building. The number of companies who were shareholders of the Association in 1905 was 153, and the shares held numbered 37,363. Of these shareholding companies, nine belong to the Barberton district, and constitute the Barberton branch of the Association; eight are colliery companies, eleven are classed as "sundry companies," seven belong to the Middelburg district, one to the Heidelberg district, and one to the

Vereeniging district, and the remainder are Witwatersrand companies grouped under the nine well-known names controlling the chief interests in that district. The Robinson "group" severed its connection with the Witwatersrand Native Labour Association in 1906, and formed a separate organisation named the "Transvaal Mines Labour Association." This body, after some difficulty, established a right to form a separate recruiting agency, and received official sanction as such. The fees for recruiting charged to each company member of the Witwatersrand Native Labour Association were increased in 1904, and are slightly in excess of the actual cost of recruiting and distributing natives, which in 1905 amounted to £2 16s. 4d. per head. The expenditure for that year was £277,461, the Association's total revenue amounting to £343,180. The balance on hand at the commencement of the twelve months was £19,746: at the close of the year £87,649. No profits are paid out to members, all moneys being invested, or expended for the improved organisation or equipment of the Association's work and accommodation. Depôts and "rest compounds" have been established at various stages of the routes by which "boys" are taken to the Rand, as well as hospital accommodation. On these buildings the sum of £2,986 was expended during 1905 for improvements, extensions, and modern sanitation. Additional expenditure in this direction to the amount of £2,866 has since been sanctioned. At many of the depôts a thorough medical examination of natives is conducted, so that none of weakly physique or constitution amongst these dwellers in a tropical climate may be needlessly exposed to the high elevation and bleak climate of the Witwatersrand, at expense to the Association and danger to such natives themselves. Advances of money for suitable clothing, and for payment of hut tax or Government fees, are made to natives, with the sanction of the Local Native Department officials. The number of natives recruited from all sources in 1905 was 101,524, as compared with 87,893 in 1904. Of these, 36,147 were obtained in other British Colonies and protectorates, 40,895 from the Portuguese coastal districts of Mozambique, Beira, and Chinde, and 24,482 from local or Transvaal districts. Of those classed "local," some 15,000 were natives who had already worked on the mines, and entered into a fresh contract instead of returning to their kraals. The great majority of the natives recruited for work on the Witwatersrand are from Portuguese territory, and constitute, with the Basutos from the Northern Transvaal, the best and steadiest workers on the fields. The periods of contract for British South African natives vary from two to eight months, and the contracts are seldom renewed; for British Central African natives twelve months, with little likelihood of renewal at the close of that period; for Portuguese East African natives twelve months. A Curator to watch the interests of his Government and those of natives is maintained on the Rand by the Portuguese Administration. The proportion of natives recruited in the Transvaal is no indication of the numbers available for labour in that Colony, as many natives from Swaziland, Southern Rhodesia, and Bechuanaland *trek* into the Transvaal during bad times in search of employment. No inducement for natives to engage themselves outside their own Colony is countenanced by the Natal authorities, consequently organised recruiting of any kind is impossible there. Many difficulties have been encountered and have been the subject of diplomatic negotiations —connected with Customs and railway tariffs and other matters of international concern—in opening up the Portuguese possessions in East Africa for recruiting purposes, the Portuguese authorities recognising the powerful lever placed in their hands by the possession of so invaluable a supply of unskilled labour. The German territories are jealously closed to British labour agencies, excepting a small portion of German South-West Africa, whence 298 natives were procured in 1905. The labour recruiting grounds are, therefore, as follows:— Transvaal and Swaziland, Orange River Colony and Basutoland, Cape Colony and Bechuanaland, Rhodesia, British Central African Protectorate, Fort Jameson (British Central Africa), the Portuguese districts of Mozambique, Beira, and Chinde, and portions of German South-West Africa. The physique of the natives from Central Africa is so poor, and the death-rate on the High Veld from unpreventable causes so heavy, that it is anticipated recruiting in those regions will be practically useless. Of the total number of natives recruited from all quarters in 1905, 11,013 were detained in hospital (the average period of illness being 12·36 days); 9,593 of these passed out to work on the mines; 160 died, and 1,260 eventually were returned to their homes as unfit for service. Of this large number most are natives from tropical areas, who are detained in hospital for care and dieting to enable them the more readily to acclimatise. Many of them, notwithstanding, are unable to adapt themselves to the new conditions, and have to be repatriated. The figures here given are entirely distinct from those relating to deaths and illnesses among mine workers on the Rand. Natives from the Cape Colony very rarely work underground, as the conditions are most unacceptable to them. Portuguese "boys" constitute upwards of 60 per cent. of the unskilled native labour on the Witwatersrand mines, and about 73 per cent. of the underground workers. The dislocation of the mining industry owing to the war, the unsettled state of the country, the high wages and allowances paid to natives by the military authorities, and two successive years of fine harvests (militating against the natives being induced to engage for labour), combined to make mining work unpopular, and to render an organised attempt to lower the wages of "boys" in the last degree injudicious. The Chamber of Mines not unnaturally considered that some such attempt should be made, as wages had previously been artificially inflated by unwise competition, defective organisation, and the action of irresponsible labour touts. The experiment had to be abandoned owing mainly to the paucity of natives seeking work under the new scale of wages, and to unjust accusations levelled against the leaders of the industry in consequence of this attempt to re-adjust economic conditions. It was pointed out by Sir George Farrar, in his presidential address to the Chamber of Mines in 1902, that not only had the industry to contend with the conditions abovementioned, but it had also to reckon with a sudden and abnormal expansion in towns, where employment of a far easier description than mine labour was offered to natives at higher wages; further, that Government departments and municipalities were calling for increased numbers of native employés, on terms more attractive than the mines could offer. It was wisely decided by the Chamber that the proper course to pursue was to instruct the Witwatersrand Native Labour Association that every effort must be made to assist the Government and the townspeople in obtaining their necessary supply of native labour— the residue to be absorbed by the mines. Valuable service was thus rendered to the Government and to the public by the Witwatersrand Native Labour Association, the important claims of agriculture being specially considered. The results of

this unselfish policy are shown below :—

		Approximately.
Before the war, maximum supply	of natives on mines..	100,000
,,	,, in towns..	25,000
1902	,, on mines..	45,000
,,	,, in towns..	37,000
1905	,, on mines..	87,000
,,	,, in towns..	50,000

In the Government service some 18,500 natives were employed in 1905, and the Native Pass Office return for native passports in other than mines employment was 90,183. Time-expired native employés to the number of 82,604 left the Witwatersrand mines during the year.

In preparation for Mr. Joseph Chamberlain's visit to the Rand, in 1903, the Chamber of Mines appointed a Committee of the consulting engineers of the various leading mining houses, and a statement of the conditions and future requirements of the mining industry (with statistics compiled for the period to the end of October, 1902) was prepared. In August, 1903, a further elaborate compilation of statistics and information was prepared for presentation to the Transvaal Labour Commission. For these two authoritative pronouncements the most recent and reliable facts were collected from every available source of information, and were honestly put forth in a form that had never been seriously questioned by competent critics. Such value as then attached to these data still accrues with but trifling modification. It would thus appear that in South and Central Africa there is a native population estimated at about 13¾ millions, but in the territories open to labour recruiting the total population only reaches some 4¾ millions. Of this number the proportion of males between the ages of 15 and 40 is put at about 235,000. It is from this aggregate that the wants of the mining, agricultural, and other industries of South Africa have to be supplied. It was considered that the following figures denoted with reasonable accuracy how the number of available labourers is absorbed :—

In mining in the Transvaal (including domestic service and private manufactories within mining areas).. ..	130,000
In mining in the Cape Colony	15,000
In mining in the Orange River Colony ..	5,000
In public works (accounted for)	27,000
On farms in Transvaal mining districts and labour areas	4,000
In public and municipal works in Natal	20,000
In municipal works and private industries in Johannesburg	2,500
Unaccounted for—such as natives employed on the public works of the Transvaal and the Cape Colony, and in domestic service and private manufactories (outside Transvaal mining area)	31,500
	235,000

In point of fact, only a portion of the natives living south of the Zambesi are available for the white man's industrial pursuits. In South Africa the bulk of the land has been settled and administered—partially, at least—for many years, and there has been a volume of trade. Thus these natives have come into contact with the European, have learned new habits, acquired new tastes and wants, and become accustomed to regard industrial labour as the means of supplying them. But in the unsettled regions and in Central Africa only a small portion of the country is under actual administration ; the greater part of it is unexplored and absolutely uninhabited by white men, and there is no trade excepting on the coast and round one or two centres. In these circumstances, as the great proportion of the natives have never seen a white man, and have no conception of the meaning of industry, it is idle to hope for an immediate emigration of labourers—unless force were resorted to, which is, of course, out of the question. There is no motive for taking the natives from their homes. Having so little opportunity for spending money, they do not feel the lack of it. Doubtless in time they will acquire wants beyond bare subsistence, and afterwards the habit of working in order to supply their needs in this direction will come, but such a change cannot be brought about suddenly. For the sake of the safe and healthy development of the native races, the change can only be permitted to take place gradually. Not until it does take place will these populations form an important source of labour, and it is subject for conjecture whether, when that time arrives, there will not be considerable and more congenial spheres of usefulness open to them nearer their own homes. In the meantime the progress of the mining industry of the Transvaal—as at present socially and economically organised—is being stifled for want of the necessary unskilled labour, and is, in common with the country at large and its inhabitants, suffering enormous losses, to put a limit to which every possible effort must be made. As an indication of what these losses threaten to become, the following statements based upon the reports above-mentioned are of interest :—

		Now employed.	*Now required.*	*Required, say, five years hence.*
Transvaal mines—Witwatersrand		60,000	130,000	370,000
,, Other districts	Gold	3,000	12,250	12,250
	Coal	7,750	12,000	25,000
	Diamond	750	1,000	3,000
Cape Colony mines		15,000	16,000	20,000
Orange River Colony mines		4,250	8,500	20,000
Transvaal public works, etc.		50,000	113,000	145,000
,, other than mines and public works ..		58,500	58,500	58,500
		119,250	351,250	653,750

No account whatever has been taken of the requirements of Rhodesia and Natal, and there have been omitted from these rough estimates the Public Works Departments of Pretoria, the Cape Colony, and the Orange River Colony, domestic service in the two latter, and agriculture in general.

It will be seen, therefore, that the labour situation, as far as it can be foreseen, is roughly thus :—

Labourers now available for work outside their districts	235,000
Total labour required at present.. ..	350,000
Shortage at present	115,000
Requirements, say, five years' hence ..	655,000

Let it be noted that in making these very rough estimates only industries are taken into account where the labour requirements can be forecasted with some approach to precision. But it is clear that once their needs are approximately satisfied other associated industries will be established, the labour requirements of which will also be great. When it is further realised that the ordinary natural increase in the labouring native population of South Africa is at a liberal estimate not more than 2 per cent. per annum, it is evident that the ordinary rate of increase must continue more and more to fall behind the large demands for labour which will inevitably arise when, not only the remarkably rich mineral resources and the future industries of the country come to be developed, but also its great tracts of uninhabited land have to be cultivated.

In conclusion, it may be affirmed that there can be little doubt in the mind of a well-informed observer that the policy of the Witwatersrand Native Labour Association has on the whole been directed towards increasing the supply of native labour for the mines, towards correcting mistakes of administration, as well as of such former dealings with natives intended for mine service as time has proved to be ill-advised or wasteful, towards conducting matters connected with recruiting in a spirit of humanity and equity, and towards safeguarding the interests of the public and of the natives, in addition to those of the mining industry.

Geological.

THE first recorded researches into the geology of the Transvaal were made by Mauch and Hübner in 1871, Cohen in 1874, Dunn in 1874-6, and Penning in 1882-3. Their labours have been closely followed by many earnest geologists, but only during recent years has a detailed and systematic study of the geology of the country been undertaken. Our present knowledge of Transvaal stratigraphy is mainly due to Molengraaff, Draper, Sawyer, Hatch, Corstorphine, Holmes, the members of the Transvaal Geological Survey, and the members of the Geological Society of South Africa. The transactions of this Society are of a very high standard, and record the latest geological researches and conclusions. Many works of reference have also been published, among which "The Geology of the Transvaal," by Dr. Molengraaff, "The Geology of South Africa," by Drs. Hatch and Corstorphine, and "The Reports of the Transvaal Geological Survey," stand out prominently. In a short review of geological work, such as this, it is impossible to make detailed reference to the numerous authors and discoverers, and all those whose labours have to be utilised in the elaboration of the subjects are requested to excuse but a general acknowledgment of their individual and collective achievements.

The geological formations known to exist in the Transvaal are now well defined, and sufficient data are available to attempt a correlation with the formations occurring in other parts of South Africa. Though there is still much to learn and many gaps to be filled up before complete correlation can be satisfactorily established, the attempt is so suggestive to the practical miner, prospector, and investor in mining property, and it is so useful an incentive to further inquiry, that it has been here deliberately undertaken. The appended tables give the generally accepted sequence of the strata occurring in South Africa, together with their probable European equivalents.

In explanation of the following table, it may be said the Cape System is considered to be represented by the Waterberg System of the Transvaal, and there is every probability that the Griquatown System of the Cape Colony and the Potchefstroom System of the Transvaal belong to the same horizon. It will be noted that the Elsburg banket-beds are placed in the Ventersdorp System, instead of in the Upper Division of the Witwatersrand System. This classification has already been urged by prominent authorities, and the step is believed to be merely an intelligent anticipation of the inevitable.

The youngest formation in the Transvaal belongs to the Upper Karroo System, which is in considerable evidence in the Piet Retief and Wakkerstroom districts, thinning out to the westward, and exposing the Lower Karroo (or Ecca) series. The fossil evidence points to the Karroo horizons being of the Permo-Carboniferous age. From this it would appear probable that since that period the Transvaal has been a land surface, or that, if any younger beds ever existed, they have been completely denuded. It is likely that further investigation will disclose the existence of fossils in formations below the Karroo System.

The maximum thickness of the South African stratified rocks is, according to recent writers, as follows:—

Karroo System	18,000 ft.
Cape System (represented by Waterberg formation in the Transvaal)	10,000 ,,
Potchefstroom System..	18,000 ,,
Ventersdorp System ..	8,000 ,,
Witwatersrand System..	19,000 ,,

(Giving a total of 73,000 ft., or rather over 13 miles.)

Below these are the much altered rocks comprising the Swaziland series, the thickness of which is not at present ascertainable.

In treating of the geology of the Transvaal, and the relation borne by it to the mineral resources of the country, it will be advisable to take each geological system or period separately, to describe its peculiarities, and briefly to enumerate its principal mines and its future economic possibilities. In addition to the systems already mentioned, there are two occurrences of intrusive igneous rocks which possess great economic importance, to each of which special reference will be made. These are the Igneous Series of the Bushveld and the Basic-breccia of the Diamond Pipes.

ARCHÆAN SYSTEM.

This name is applied to the old granite, the schists, and to the other altered rocks into which the granite is intrusive. The schists are well-developed in Swaziland, from which district they derive their name, but they occur also over large areas of the Eastern and North-Eastern Transvaal. The Swaziland formation consists of slates, quartzites, conglomerates, and schists, with occasional masses of intrusive granite and gneiss. Many interesting rocks are found in this formation, as for instance the "calico rocks" of the early miners at Marabastad. This is a magnetite-quartzite slate, identical in appearance with the well-known Hospital Hill slate occurring in the lower division of the Witwatersrand series. The striking resemblance caused some of the earlier geologists to consider the rocks now classed with the lower Witwatersrand series as of the same age as the Swaziland schists. Further investigations have, however, shown banded magnetite-quartzite slates to occur both in the Pretoria series and the dolomite series of the Potchefstroom System. The old or grey granite associated with the schists is described by Molengraaff as a biotite, or a hornblende-biotite granite, more rarely a granite with two micas, and occasionally a granite with muscovite. The felspathic element is represented as often by orthoclase as by the plagioclase and microcline. In the contact-zones of the granite with the schists a large number of contact minerals are found in the latter rocks, such as andalusite, garnet, corundum, staurolite, etc. In considering the economic bearing of a study of the old granite, it should be noted that there are three large bosses of this old granite near the Witwatersrand Goldfields—known as the Witwatersrand Boss, the Heidelberg Boss, and the Venterskroon Boss. Sometimes the schists are found in connection with the granite; in each case the latter is overlaid unconformably by the Witwatersrand System, or by one of the younger systems of rocks.

The schists usually dip vertically, or at a very steep angle, and the gold-bearing quartz veins generally follow the strike and dip of the strata. The earliest gold workings in the Transvaal were in these schists, at Eerstelling (Marabastad), near Pietersburg. The district has not had a very fortunate history, and for some years no work was done on the fields: but recently the quartz veins at Eerstelling and Mont Maré have again been opened up, and with the greater knowledge that can now be brought to bear, and increased facilities owing to the close proximity of the railway, it is considered that the district will have a better chance than ever before.

The most important mine yet discovered in the schists is the Sheba Gold Mine, Barberton district, the width of the pay chute here being in places as much as 120 ft. The Barberton district experienced an important "boom" in the latter eighties, but on the discovery of the Witwatersrand it gradually fell into neglect. At the present time there are but three companies making regular returns from the district, but there is every indication that a revival of activity is about to take place in small mining propositions of five to ten stamps, and in alluvial ventures. The Murchison and Klein Letaba goldfields are also located in this formation. Work in these districts has been mainly confined to quartz veins of a lenticular character which are intercalated in the schists. Many of these occurrences are very rich, but those so far discovered have been characterised generally by pay-zones of limited extent. The best known and most persistent of these ore-bodies is perhaps the Antimony Reef, near Leydsdorp, in the Murchison district. Lack of transport, bad management, and a rather unhealthy climate have been the main drawbacks to the success of these fields. Quite recently, however, a gold discovery of an entirely different nature was made. It is described as a decomposed and altered sheet of basic igneous rock (pyroxene). It is being worked by the Louis Moore Company.

There is no question but that the overshadowing of the whole gold-mining industry of South Africa by the enormous development of the conglomerate propositions of the Witwatersrand Fields has led to the quite unmerited neglect of the type of ore-body typical of the schist formations. The gold-mines throughout Rhodesia occur, almost without exception, in schistose rocks of the Archæan age; and, in addition to ore-bodies of the quartz-vein type, the Archæan rocks there furnish another and distinct kind of ore-body, where the gold occurs in zones of great width but of comparatively low grade. Only recently does a serious attempt appear to have been made to prospect for this type of ore-body in the Transvaal. Serious exploitation is being undertaken in the Archæan formation occurring at Abelskop, Botmansrust, and at the Kunana Native Location, Bloemhof and Lichtenburg districts, and there the best values appear to be found where the rock has been most disturbed and plicated. Recent development work at Pigg's Peak in Swaziland is exposing excellent values in these Archæan schists at their point of contact with the intrusive granite. Though the earliest prospecting in this, the most ancient of the Transvaal geological formations, was confined to gold, the occurrence of tin in very considerable quantities was recognised in Swaziland at least fifteen years ago, cassiterite occurring in pegmatite veins traversing the granite, as well as in veins in the schists. Tin has been produced for some years past from the alluvial deposits in the western districts of Swaziland lying between the Komati and Usutu rivers, but, although a certain amount of work has also been done on the reef tin, its payability has not yet been thoroughly established. Occurrences of some of the rarer minerals and earths have been met with in the schists of Swaziland, such as Euxenite (a source of tungsten) and Monazite (a source of the thorium used for incandescent lamps). The horizon here discussed is usually taken to correspond with the Namaqualand schists which have so important a development on the western side of the subcontinent; and, the Namaqualand rocks being a well-known source of copper, it was to be expected that the Transvaal should also hold out a promise of that metal. In the northern portion of the Zoutpansberg district copper has been found in the Archæan rocks near the Limpopo river. The ore, occurring in bodies of lenticular form as copper-glance, is shipped in bulk to Europe, after careful hand-sorting. Other minerals are found in the Swaziland series, cinnabar occurring in a sericitic schist in the Lomati Valley, Eastern Transvaal, and antimony ore in the amphibolites near Forbes Reef, Swaziland. It is probable that with careful prospecting many valuable discoveries will be made in the Archæan rocks, as there are large areas covered by this formation that have not yet been prospected.

WITWATERSRAND SYSTEM.

In this system occur the "banket" reefs of the Rand. Owing to their great economic importance more attention has perhaps been paid to this group of rocks than to all the other formations. The system has been divided for convenience into an upper and a lower division, the lower division being stratigraphically below the Main Reef conglomerate, and the upper division above it. The lower division is mainly composed of slates with occasional beds of quartzites, and a few bands of conglomerates. The upper division consists chiefly of quartzites, and there are a large number of conglomerate beds, which are best developed on the Witwatersrand, but occur also in the Middelburg, Potchefstroom, and Klerksdorp districts. In the south-east of the Transvaal they are also found out-cropping in the Ermelo and Piet Retief districts, and in Swaziland. The great value of the Main Reef series of conglomerates on the Witwatersrand has encouraged the search for these reefs in the other districts of the Colony where this formation is exposed. A brief description of a typical cross-section of the beds at Johannesburg is here given:—

Lower Division.

Sericitic and Talcose Schists (sometimes absent).
Orange Grove Quartzites.
Water Tower Slates.
Ripple-marked Quartzites.
Red Slates.
Speckled Bed.
Hospital Hill Slates.
Hospital Hill Quartzites.
Doornfontein Slates.

The Orange Grove Quartzites, north of Johannesburg, rest unconformably upon the old granite, and form a conspicuous escarpment towards the north. They consist of two belts of quartzites with an interbedded band of slate, the whole formation dipping south at about 35°. They are succeeded by a band of highly magnetic slates which are named the Water Tower Slates. Above these slates is another band of quartzite known as the Ripple-marked Bed. This can be readily recognised owing to the fact that the overlying beds of red slate have weathered away, exposing a well-marked dip-slope, on which ripple-marks are occasionally seen. The red slates above them are of considerable thickness, and somewhat soft and easily weathered. They are succeeded by a thin band of quartzite, the Speckled Bed, which is noted for its

TABLE OF SOUTH AFRICAN STRATA,

DEMONSTRATING TRANSVAAL GEOLOGY.

EUROPEAN EQUIVALENTS.	SOUTHERN CAPE COLONY.	NORTHERN CAPE COLONY.	ORANGE RIVER COLONY.
	SUPERFICIAL DEPOSITS	SUPERFICIAL DEPOSITS.	SUPERFICIAL DEPOSITS.
CRETACEOUS	*Coastal System.* — Umtamvuna Series. — Uitenhage Series. — Sunday River Beds. Wood Bed. Zwartkop Sandstone. Enon Conglomerate.	— —	— —
RHÆTIC	*Karroo System.* — Upper Karroo or Stormberg Series. — Volcanic Beds. Cave Sandstone. Red Beds. Molteno Beds.	*Karroo System.*	*Karroo System.* — Upper Karroo or Stormberg Series. — Cave Sandstone. Red Beds. Molteno Beds.
	Karroo System. — Middle Karroo or Beaufort Series. — Zone of specialised *Thecodonts.* Saudstones & Shales with *Dicynodon.* Sandstones & Shales with *Parciosaurus.*		*Karroo System.* — Middle Karroo or Beaufort Series.
PERMO-CARBONIFEROUS.	*Karroo System.* — Lower Karroo or Ecca Series. — Upper Shales and Sandstones. Dwyka Conglomerate. Lower Shales.	*Karroo System.* — Lower Karroo or Ecca Series. — Upper Shales and Sandstones. Dwyka Conglomerate. Lower Shales.	*Karroo System.* — Lower Karroo or Ecca Series. — Upper Shales and Sandstones. Dwyka Conglomerate.
DEVONIAN	*Cape System.* — Witteberg Series. Bokkeveld Series. Table Mountain Series.	*Cape System.* — Matsap Series.	— —
	Cango Series. (Ibiquas Series?) — Slates. Dolomite. Grits. — Sheared Conglomerate.	*Griqualand System.* — Griquatown Series. Campbell Rand Series. Keis Series.	*Potchefstroom System.*
		Amygdaloids of the Vaal River.	*Ventersdorp System.*
			Witwatersrand System. — Upper Division. — Lower Division. — Hospital Hill Slates.
ARCHÆAN	*Archæan System.* — Malmesbury Series and Intrusive Granite.	*Archæan System.* — Namaqualand Series and Intrusive Granite.	*Archæan System.* — Swaziland Series and Intrusive Granite.

N.B.—A wavy line thus ~~~~~ indicates the presence of an unconformity.

TABLE OF SOUTH AFRICAN STRATA,

DEMONSTRATING TRANSVAAL GEOLOGY.

TRANSVAAL.

SUPERFICIAL DEPOSITS.

Karroo System.
- Upper Karroo Series.
  - Voleanie Beds (of Springbok Flats and the Lebombo.
  - Bushveld Sandstone.
  - Red and Green Marls of the Lebombo.
  - Komati Poort Coal-measures (Upper).
- Hoogeveld Series. (Beaufort Beds?)
- Lower Karroo or Ecca Series.
  - Sandstones, Shales and Coals.
  - Dwyka Conglomerate.

Waterberg System.
- Waterberg Series.

Potchefstroom System.
- Pretoria Series.
- Dolomite Series.
- Black Reef Series.

Ventersdorp System.
- Klipriversberg Amygdaloid, Boulder Beds and Volcanic Breccias.
- Elsburg Series.

Witwatersrand System.
- Upper Division.
  - Kimberley Series.
  - Bird Series.
  - Main Reef Series.
- Lower Division.
  - Doornfontein Slates.
  - Hospital Hill Quartzites.
  - Hospital Hill Slates.
  - Speckled Bed.
  - Red Slates.
  - Ripple-marked Bed.
  - Water Tower Slates.
  - Orange Grove Quartzites.
  - Sericitie and Taleose Schists.

Archæan System.
- Swaziland Series and Intrusive Granite.

NATAL.

SUPERFICIAL DEPOSITS.

Coastal System.
- Umtamvuna Series.

Karroo System.
- Upper Karroo or Stormberg Series.
  - Voleanie Beds.
  - Cave Sandstones.
  - Red Beds.
  - Molteno Beds and St. Lucia Coal-measures.
- Middle Karroo or Beaufort Series.
- Lower Karroo or Ecca Series.
  - Upper Shales and Sandstones.
  - Dwyka Conglomerate.

Cape System.
- Table Mountain Series.

Witwatersrand System.
- Lower Division.
  - Hospital Hill Slates.

Archæan System.
- Swaziland Series and Intrusive Granite.

RHODESIA.

SUPERFICIAL DEPOSITS.

Karroo System.
- Upper Karroo Series.
  - Tuli Coal-measures.
- Lower Karroo or Ecca Series.

Archæan System.
- Swaziland Series and Intrusive Granite.

N.B.—A wavy line thus ~~~~~ indicates the presence of an unconformity.

extraordinary persistency. It is very narrow, seldom as much as 8 ft. or 10 ft. wide, and is remarkable for its small brown clayey patches in the surface specimens. Above the Speckled Bed occur the Hospital Hill Slates, which are the best known and most easily distinguished of all the "markers." This bed is frequently contorted, and consists of alternate layers of jasper, quartz, specular iron, and magnetite. It is similar in appearance to the calico rock occurring in the Archæan rocks. The red, white, and black alternating stripes make the rock readily recognisable. The contorted bed occurs only near the base of the Hospital Hill Slates, and is seldom of any great thickness. The Hospital Hill Slates have been the subject of considerable controversy as to their igneous or sedimentary origin. Their composition and microscopic features leave, however, little doubt as to a sedimentary origin. Immediately overlying the Hospital Hill Slates are the Hospital Hill Quartzites, formerly known as the Green Quartzites. It is now considered that a more suitable characteristic than their colour is their structure, the quartz grains on a freshly-fractured surface appearing round and pellucid, with a resemblance of cooked sago. The horizon of the Hospital Hill (or Green) Quartzites promises to become of increasing interest when economic conditions permit of development being pushed along others than the conventional Main Reef line. Near the bottom of this formation one of the leading authorities places the quartzite reefs (with some very thin beds of banket) of the Struben and what is now known as the Louison Series, most typically developed on the farms Wilgespruit and Roodekrans, a short distance north of Roodepoort township. The Louison Series is that formerly prospected as the "North Rand A," and now being opened up by the North Witwatersrand Gold Mines. Those interested in the area have named two clearly-marked banket reefs (intervening between the Louison Series and the Government Reef conglomerate) respectively the "Du Preez" (or Rietfontein) and "North Coronation" Series.

The Hospital Hill Quartzites at Johannesburg are overlaid by a series of soft and easily-weathered shales, of which few outcrops are observable, the surface soil being deep. The shales continue nearly to the outcrop of the Main Reef Series, where the so-called Red Bar is encountered. This is a reddish sandstone almost immediately underlying the Main Reef. Many of these beds, or "markers," as they may be termed, have been recognised also in other districts of the Transvaal.

In the Potchefstroom district the lower division of the Witwatersrand beds is more strongly developed than on the Rand, or otherwise an apparently great thickness is caused by a duplication or triplication of the strata. In the Central Rand the thickness of the lower beds is about 10,000 ft. The upper division of the Witwatersrand System at Johannesburg is about 7,000 ft. thick, including the quartzites overlying the Kimberley Series. It consists of the following beds, in ascending order :—

Upper Division.

Main Reef Series.
Bird and Livingstone Reef Series (with which is usually correlated the Chimes or Modderfontein Series on the Eastern Rand).
Kimberley Reef Series.

The Main Reef Series, which is on an average about 100 ft. in width, carries in the Central Rand three important ore-bodies. The Main Reef itself is the underlying body, and is a wide reef, usually of low grade, its average thickness being 7 ft. or 8 ft. ; but in places it widens out to more than 50 ft. across, although where it is of this great width the value is correspondingly poor. It is seldom sufficiently rich to work at a profit, unless on a large scale at unusually low working costs. Above this ore-body is the Main Reef Leader, its distance from the Main Reef varying from about 8 ft. down to nothing. The leader is a smaller ore-body, but is much richer than the Main Reef, and is profitably worked by all the mines on the Central Rand, its average width being about 18 inches. This is often split into "stringers," separated by bands of quartzite containing scattered pebbles. At its foot, and between it and the Main Reef, is the so-called interbedded dyke, which is really only a very fine-grained quartzite. It is, however, a useful indicator on many of the mines, as it cannot be mistaken for the interbedded bands of quartzite above referred to ; and when the miners see it they know there are no more "stringers" of the Main Reef leader below. Further to the south again, at distances varying from 35 ft. to 100 ft., is the South Reef, which is the thinnest, and for its width certainly the richest ore-body worked on the Rand. In the Central Rand the width averages about 8 in. to 12 in., but proceeding west it becomes much thinner, being often nothing more than a layer of pebbles, while in the Roodepoort district (where it is very profitably worked) it is sometimes little more than a thin ferruginous seam. In the East Rand, however, the South Reef is of very little importance, and in its further eastern occurrence gradually becomes too poor to work.

The reefs change in character considerably at different points along the Rand—some bodies dying out, in some cases being replaced by others. Thus at the East Rand Mines only one reef is worked, and the whole of the Geduld-Springs basin is characterised by but one pay-reef, which is usually less than 1 ft. thick. The conglomerates of the Main Reef Series consist of rounded pebbles of quartz varying from the size of a pea to that of a hen's egg ; occasionally chert, quartzite, and slate pebbles are found, but they are not numerous. The pebbles are cemented together by pyrites, and secondarily deposited silica, the gold always being found in the matrix and usually closely bound up with the pyrites—the pebbles themselves containing no gold. It is now generally agreed by geologists that the gold in the conglomerates was not present there when the beds were originally laid down, but was introduced at some later period by the agency of percolating waters, which also brought the pyrites and silica that transformed these shingle-beds into the compact rocks we know to-day.

The Main Reef Conglomerates between Boksburg and Krugersdorp dip to the south at angles varying between 15° and almost vertical, the average inclination of the beds being between 30° and 35°. At Krugersdorp the outcrop takes a sharp turn to the south through the Randfontein properties, the dip being to the east at an average angle of some 60 to 70° ; from there the beds are lost, going presumably south-west under the Black Reef and Dolomite Series. Boreholes on the probable reef extension, through the dolomite, have encountered a payable reef in one or two instances, and no doubt future work on this line will solve the stratigraphical problem.

On the East Rand, beyond the eastern boundaries of the farms Vogelfontein and Leeuwpoort, the course taken by the Main Reef Series is obscured by overlying coal measures. It is again exposed for some distance between the farms Benoni and Klipfontein, but further east it once more disappears under younger formation. Our knowledge of reef conditions

between this point and the outcrop exposed near the Nigel Mine has been obtained entirely from boreholes; from these it appears that on the farms Geduld, Cloverfield, Welgedacht, Grootvlei, Daggafontein, Vogelstruisbult, and probably on Holfontein, Droogefontein, Palmietkuil, and Rietfontein, the Main Reef Series forms a shallow basin, in which the gold-bearing reef is in nearly all parts at a workable depth. Maps which have been prepared, giving contour lines showing the probable position of the reef sub-outcrop with every additional 1,000 ft. in depth, indicate the likelihood of a series of minor folds, or synclines, and anticlines, before the reef takes its final bend towards the Nigel Mine. An interesting and important fact established as a result of boring on Daggafontein is that one of the reefs recognised as belonging to the Kimberley Series shows high assay results in more than one hole. So satisfactory, indeed, were the values, that this reef was taken at first to be the Main Reef. Later investigations showed that the Main Reef occurs about 1,000 ft. lower. In any case, the results secured by borehole prospecting alone cannot be closely relied upon in estimating the probable value of this area. In the Heidelberg district a great deal of prospecting has been done on the Witwatersrand beds from time to time, but with generally disappointing results. The Coronation Reef is now taken to be situated in the horizon of the Hospital Hill Quartzites, and promised at one time to be a valuable ore-body, but development so far has proved the rich chute to be of a limited extent; and this has been the experience with other prospects in the Heidelberg district. At Klerksdorp the same disappointing results have occurred in the Lower Witwatersrand formation on the Dominion Reef. This reef lies almost directly on the old granite, and is characterised by a footwall of schist. It can be traced for many miles, but only in places has it shown any gold value to speak of. The Upper Witwatersrand beds in the Klerksdorp district contain one or two mines that have worked reefs with a certain amount of success, more especially the Buffelsdoorn Mine, the reef of which has been placed by some geologists in the Elsburg Series. The stratigraphical position of the reefs of others of the Klerksdorp Mines, such as the Elandslaagte and the Africander, is still a matter of doubt.

The Bird and Livingstone Series consist of quartzites with a number of beds of conglomerate. The pebbles in these conglomerates are much smaller than those contained in the Main Reef Series, and consist principally of quartz. Their gold contents are usually low, although on the far East Rand under the name of the Modderfontein Series they have been worked to a small extent.

The Kimberley Series are rather more important, and in places carry payable gold values, one of the reefs of the series being worked near Krugersdorp under the name of the Battery Reef. It contains a great number of reefs, some being of considerable width. The pebbles are mostly quartz, but striped slate pebbles also occur. The conglomerates are interbedded in quartzite; under this is a thick belt of banded slate, which serves as a useful "marker" when boring for the Main Reef Series beneath. The slate on the far East Rand resembles the slate underlying the Main Reef in that district, and it is only under the microscope that the difference between the rocks can be distinguished. The most striking characteristic in the Kimberley slates observed under the microscope is the presence of rutile in its hair-like needles, the mineral being absent in the footwall slates of the Main Reef.

There are numerous signs of volcanic activity in the Witwatersrand beds, there being a number of sheets of diabase (some amygdaloidal) intercalated between the strata at different horizons. These probably were poured out during the period in which the beds were being laid down, as they show evidence of being considerably altered. The formation is also cut in many places by dykes of a later date, every mine on the Rand showing examples of these intrusions—so much so, that the custom in estimating reef tonnages on the fields is to deduct as much as 10 per cent. It is held by some authorities that these dykes had some influence in depositing the gold in the reefs, although it is not possible to formulate any law on the subject. The reef value on one side of the dyke is often much richer than on the other, and sometimes the reef changes in value on approaching one of these intrusions.

Ventersdorp System.

Overlying the Witwatersrand System, and separated from it by a marked unconformity, is a series of rocks grouped together under the name of the Ventersdorp System. It is only very recently that these rocks have been recognised as forming a distinct system, although the Elsburg Series and the Klipriversberg Amygdaloidal Diabase, both of which belong to it, have been well known to South African geologists for many years. Besides the Elsburg Series, which consist of quartzites and conglomerates, there are other sedimentary rocks, but this formation consists for the most part of volcanic rocks. The system was first noted on the farm Hartebeestfontein, some 20 miles west of Klerksdorp, where breccia, tuff, chert, and boulder-conglomerate occur, the whole series lying on the old granite. The sequence of the rocks constituting this formation, and their thickness, vary considerably at different places. The most typical rock of the system is a very coarse conglomerate, particularly well developed within the Transvaal, in the Ventersdorp, Klerksdorp, and Wolmaransstad districts, with boulders occasionally some feet in diameter, the matrix being a coarse quartzitic grit coloured by iron. The pebbles are derived from all kinds of rocks, and consist of quartz, striped slate, quartzite, and also banket derived from some older formation. Some of these banket pebbles were found to carry high gold values, and a good deal of fruitless prospecting was done on these boulder-beds near Ventersdorp, and also on Sendelingsfontein, in the Wolmaransstad district. The fact of these pieces of banket carrying gold points to the gold having been already deposited in the original banket before the boulder-beds were laid down, and makes it probable that the Rand conglomerates (to which these banket boulders bear a striking resemblance) have been auriferous from a very early geological period. The Ventersdorp beds outcrop over a very large part of the south-western Transvaal; but the boulder-beds, the igneous breccia, and the cherts, are entirely of minor importance in comparison with the amygdaloidal diabase which covers many hundred square miles near the Vaal River between Klerksdorp and Fourteen Streams. The name "Vaal River System" has been proposed for these beds, but has not found general acceptance. In many parts of the South-Western Transvaal the Ventersdorp beds are hidden by a surface deposit of limestone, in some parts this being the only rock to be seen for miles; but when sinking wells it is usually found that amygdaloidal diabase is met with at a comparatively shallow depth. Near Schweizer-Reneke the Ventersdorp beds are represented by quartzites, and in the Klerksdorp district it is probable that the banket reef worked by the Elandslaagte Mine belongs to this system. Near the Rand the Elsburg beds have

been worked for gold, but usually with very indifferent success. Immediately south of Johannesburg the Elsburg Series is apparently conformable with the uppermost Witwatersrand beds, and for this reason there exists a certain doubt as to whether they really belong to the Ventersdorp System or not. On Doornkop, however, the Elsburg beds show a different dip to the underlying Witwatersrand strata, while the occurrence of typical Elsburg rocks on Jeppe's Hill to the east of Johannesburg can hardly be explained save by the assumption that they were laid down unconformably on the Witwatersrand rocks. The Du Preez Reef cannot be traced in either direction beyond the boundary of the Rietfontein Mine; but, if it is taken to be an outlier of the Elsburg Series, many of its peculiarities (and those of adjoining formations) can be more easily explained. Besides the occurrence of the amygdaloid south of the Rand at Klipriversberg, there are very extensive flows of this rock in the Heidelberg district, forming the range known as the Zuikerbosehrand. Other types of the rocks of this system occur in the Heidelberg district, but they are not strongly developed. To the west of the Transvaal, in Beehuanaland, these breccias and boulder-beds were at one time mistaken for dwyka conglomerate, but from their stratigraphical position alone it is now clear that they belong to the Ventersdorp System. In the Wolmaransstad district, besides the diabase, there are large areas covered by an acid igneous rock, a quartz-porphyry, belonging to this system.

Potchefstroom System.

The Potchefstroom System, lying unconformably on the Ventersdorp System, consists of three distinct series of rocks, which were formerly treated separately; but, as they are unquestionably conformable, and grade into one another, they are treated as belonging to one system. They consist of the Black Reef Series at the bottom, the Dolomite Series in the middle, and the Pretoria Series at the top. These rocks occur in many different parts of the Transvaal, but all three series are typically developed in the Potchefstroom district.

The Black Reef Series in the Southern and Western Transvaal is seldom as much as 200 ft. thick, but is more fully developed in the Lydenburg district, where (under the name of the Drakensberg Sandstone) it attains a thickness of over 2,000 ft. It consists on the Witwatersrand of a hard quartzite of dark colour, with a conglomerate at its base; in places the matrix of the conglomerate is black, from which fact the series derives its name. In some districts the conglomerate has been worked for gold. Although very rich in places, the gold contents are erratic, and the shutes are usually of limited extent. The Black Reef has in many places been worked at a profit, more particularly in mines to the south and south-east of Johannesburg (including the Orion, Minerva, Grosvenor, and others). In the Klerksdorp fields the Eastleigh and Ariston have given good returns for limited periods. In this district the reef can be readily traced for many miles in a south-easterly direction by a line of small trees that mark its outcrop, and is known as the Boschrand. On the northern edge of the Witwatersrand granite boss it lies directly on the old granite, and has been mistaken by some for the Witwatersrand Series, owing to its flat dip and an occasional duplication tending to exaggerate its real thickness. At Kromdraai, north of Krugersdorp, the formation has been worked for gold, but there has not been any regular output from this source. In the Lydenburg district, where it is exceptionally well-developed (its thickness here being much greater than elsewhere), it forms the range of the Drakensberg (which is really but the eastern escarpment of the central plateau), these bold mountains commanding the long stretch of low veld that reaches to the Lebombo Hills on the Portuguese border. On the eastern escarpment the whole system dips to the west at an angle of about 5° to 8°, the rugged nature of the country being entirely due to the effects of erosion, and the various strata retaining their relative horizontal positions for long distances in a northerly and southerly direction.

In the Western Transvaal it forms the base of a huge syncline, resting usually on beds of the Ventersdorp System. The greater portion of the Marico and Rustenburg districts lie within this basin. Near both Johannesburg and Klerksdorp the older sedimentary beds are gold-bearing, and it is just in these districts that the values in the Black Reef have been sufficiently encouraged to induce prospectors to open them up.

In the Dolomite Series there is no well-defined line marking the change from the Black Reef Series to the higher horizon. Between the Black Reef quartzites and dolomite there is occasionally slate interbedded. To the north of Krugersdorp this is known as the Kromdraal Slate, and it contains an interbedded quartz vein which has been worked for gold. Beds of clay slate are also found interstratified in the lower part of the Dolomite Series, and the same phenomenon has been observed at the contact between the Dolomite and the Pretoria Series, the lower portion of the Pretoria beds containing thin interstratified beds of dolomite. The Dolomite Series is composed of beds of dolomite, alternating with thin bands of chert, the cherty portions being chiefly in the upper divisions of the series. The chert withstands the effects of weathering better than the dolomite, and frequently forms ridges and hills, making it appear more strongly developed than is really the case. By the Boers this dolomite is called "Oliphants Klip," owing to the resemblance of its weathered surface to the wrinkled hide of an elephant. The dolomite occurs in the Eastern Transvaal in the Lydenburg district; in the Western Transvaal it forms part of the big syncline previously referred to in connection with the Black Reef Series; and it occurs to the west and north of the Witwatersrand granite boss, whence a thin strip runs down to the Vaal River near Klerksdorp, disappearing in the Orange River Colony under the Karroo Beds. East of the boss, the dolomites disappear below the coal measures, subsequently re-appearing in the Carolina district, whence their strike is uninterrupted into Lydenburg. Apart from its mineral riches, the Dolomite is one of the most important formations from an economic point of view, it being in the Transvaal the great reservoir of the water supply. During the rainy season it absorbs a large percentage of the rainfall, which finds its way underground by fissures into caves and subterranean reservoirs, and from these most of the perennially-flowing rivers of the country derive their supplies. Occasionally rivers flowing over this formation disappear through fissures, and after running underground re-appear at the surface some miles distant. The town of Johannesburg obtains its excellent water supply from the dolomite, the water being pumped from Zuurbekom, a farm some 18 miles to the south-west, and obtained from wells sunk in this formation. The amount supplied from this source has been up to the present more than equal to the requirements of the town, and of some of the mines. A variety of minerals are found in the dolomite, including gold, silver, lead, zinc, and asbestos, and in smaller quantities copper and quicksilver. The most important mines occurring in the formation are

the gold mines of the Lydenburg district, those near Pilgrim's Rest controlled by the Transvaal Gold Mining Estates and the Glynn's Lydenburg being perhaps the most conspicuous. These mines work narrow interbedded quartz veins, dipping with the formation to the west at angles of between 5° and 8°. The mines controlled by the Transvaal Gold Mining Estates work a reef of this character situated near the top of the formation close to the contact of the overlying Pretoria beds. At Glynn's Lydenburg the reef is situated near the base of the dolomite and close to its contact with the underlying Black Reef Series. As the contact of the dolomite with the overlying and underlying rocks is exposed for some hundreds of miles, it is probable that many other payable deposits exist; but the outcrops are frequently covered by material that has washed down from the hills, which makes prospecting difficult and expensive. The reefs on the upper contact often contain copper, while this metal is generally absent in the lower series of reefs, the characteristic minerals in the latter being of manganese. The gold in the reefs of this locality appears to have some genetic connection with the numerous sheets and dykes of diabase which occur in the dolomite, as it is usually near these intrusions that the richer patches are found. In Western Transvaal, in the Marico district near Ottoshoop, gold is found in vertical quartz veins striking N.N.E. and S.S.W. Very rich specimens are found here, but the reefs are patchy, and at comparatively shallow depth huge quantities of water are encountered which have effectually stopped all development. In this district also argentiferous and zincblende have been discovered in lenticular deposits in the dolomite. Quite recently a highly argentiferous body of galena was encountered in the dolomite to the south-west of Pretoria, of the usual and normal lenticular character. In places where the dolomite has been subject to alteration from pressure, or the action of igneous rocks, it has become marmorised, and at some future date this formation may be worked for marble. In the Carolina district there occurs in the dolomite a thin sheet of highly basic igneous rock, which has been altered to a serpentine. In this asbestos has been found, and it is probable that the deposit will be sufficiently profitable to work at some date when economic conditions are more favourable.

The Pretoria Series consists of alternating beds of quartzites and shales, and in most districts is characterised by numerous intercalated sheets of diabase. In the Transvaal Geological Survey report for 1904 the following sections and widths are given for this formation from above downwards as it occurs to the south-east of Pretoria :—

Upper quartzite (Magaliesberg quartzite), with intrusive diabase sheets, 1,500 ft.
Shales and slates with diabase sheets, 530 ft.
Middle quartzite (Daspoort quartzite).
Diabase quartzite (thick sheet underlying the last).
Shales and slates, with subordinate diabase sheets, 320 ft.
Lower quartzite (Timeball Hill quartzite).
Shales (a thin development of soft shales)—
(the total thickness being not less than 10,000 ft.)

These rocks are remarkably well developed near Pretoria, striking in a westerly, and then northerly, direction past Rustenburg into the Marico syncline. They dip to the north at an angle varying from 5° to 20°, the three beds of quartzite forming well-defined ridges with the shales occupying the intervening valley. To the north, on the dip side, the ridges form a gentle slope, but to the south they are characterised by a steep escarpment, which in the case of the Magaliesberg quartzites is in places as much as 500 and 600 ft. high. The disintegration of the shales and diabase in the valleys makes a very fertile soil, and as the district is well watered it is one of the best agricultural centres in South Africa. To the south of Johannesburg the Pretoria Series again outcrops, in the Gatsrand. In the Lydenburg district it forms a broad belt running north and south. The shales appearing to be particularly well developed, the series is called in this district the Lydenburg Shales. Occasional outcrops of this formation appear also a little further west on both banks of the Oliphants River, near the junction with the Selons River, but the geology of this part of the country has not yet been correctly delineated. The gradual transition from the underlying dolomite to Pretoria Series is well shown in the neighbourhood.

There are a variety of ore deposits in the Pretoria Series, but they have not up to the present been worked on any large scale. In the lowest belt of quartzite there are interbedded deposits of magnetic iron ore, which occur not only at the Timeball Range, near Pretoria, but also in other parts of the country at the same geological horizon. No persistent attempt has, however, yet been made to work iron ores in any part of South Africa.

West of Krugersdorp, the neighbourhood of Blaauwkank has been prospected for gold in a desultory way for over 25 years, both alluvial and quartz veins being worked. This farm, and two others further west—Rietfontein and Vogelstruisfontein—on the same geological horizon, are proclaimed gold farms. Very rich patches of alluvial have been struck here, but owing to lack of water they have not been worked consistently. The quartz veins occur in the shales, and are usually interbedded with them. West of Pretoria, south of the Magaliesberg Valley, work has been done on the farm Scheerpoort and adjoining farms. The gold occurs in vertically-dipping quartz veins in the shales, there being two series of veins striking at nearly right angles to each other. The rich patches are, however, of limited extent, and little is now being done on these deposits. In the Lydenburg district, also, gold reefs interbedded in the shales have been worked on Nooitgedacht and adjoining farms, a few miles to the east of the town. Near the base of the series the Bewitt Reef occurs on the farm Frankfort, and is worked by the Lisbon-Berlyn Company.

To the south-east of Pretoria, and running thence in an east-south-easterly direction, is a belt of mineralised shales in which are found silver, lead, and copper, the lodes being usually characterised by carrying a very large percentage of carbonate of iron. In some places these reefs carry an appreciable amount of gold. Among the mines that have been worked on this line may be mentioned the Willows Silver Mine, near Hatherly, the Transvaal Silver Mine on Dwarsfontein, and copper on Boschkop and Ondeswaanskraal. Further to the north, and at a higher geological horizon, a silver-lead occurrence is worked on Edendale, the ore containing also appreciable quantities of zinc. The cobalt lode near Balmoral occurs in the horizon of the Magaliesberg quartzites. Flagstones found in the lower beds of the series answer very satisfactorily for paving stones and similar purposes. In the upper strata of this formation near Belfast occurs a bed of slightly argillaceous limestone, possessing a very fine and even grain. On the farm Bergandal, near that township, the occurrence is being worked for marble. Polished specimens, having a very excellent appearance, have been used for lithographic work.

The Waterberg System.

The sandstones, grits, and conglomerates of the Waterberg formation have received an attention so inadequate to their geological importance in the Transvaal, that there is a doubt whether, in existing circumstances, "Waterberg Series" would not be a truer designation than the present more comprehensive heading. In face of the fact that a comparatively small area of this formation (as well as of the vast area covered by the very important allied formation elsewhere described under the title "Igneous Series of the Bushveld") has received detailed study, it is probable that many of the views held to-day may call for revision. Hence it is only tentatively that the designation and sequence now given of these two series is adopted. What are taken to be indistinct fossil impressions (of crinoids) have been found in the upper beds of the Waterberg formation. A strong unconformity between the Waterberg beds and the Pretoria Series is clearly established; more doubtful is the stage in the laying down of the Waterberg rocks at which was erupted the huge igneous complex of the Bushveld. At Balmoral, red granite which is identical with that of the Bushveld has been intruded in the form of a laccolite into the lowest beds of the series. In the Waterberg district these beds rest usually upon red granite or upon felsite, and in the Zoutpansberg district the Waterberg sandstone has been noticed resting upon the older grey granite. The Waterberg formation is more particularly developed in the district of that name, and in the Northern Transvaal, whence it appears to extend considerably into Rhodesia. The only other region in which it occurs is apparently between Pretoria and Middelburg, in the central Transvaal. In the great plateau of the Waterberg district, known as the Palala Plateau, these rocks attain an average thickness of some 3,300 ft., and consist almost entirely of sandstones with occasional beds of conglomerate. The whole formation is characterised by a marked purple, red, or brown colour; it usually lies nearly flat; and false bedding and ripple-marking point to the probability of the strata having been laid down in shallow water affected by strong but variable currents. At its base is frequently found a very coarse conglomerate, the pebbles being mostly derived from the older sedimentary formations, although in some parts felsite pebbles are often encountered. Jasper pebbles also are frequent, and give the rocks a characteristic red appearance. This basement conglomerate is in places nearly 100 ft. thick. Shales occur occasionally, but are not prominent. Some observers report the frequent intrusion of igneous rock, but others state dykes to be scarce in the southern portion of the Palala Plateau. As yet the economic importance of the Waterberg rocks is insignificant; impure iron ores occur, and gold has been found in very small quantities in the conglomerates.

The Igneous Series of the Bushveld.

This vast complex (probably covering an area of over 15,000 square miles) of plutonic and igneous rocks occupies most of the central basin of the Transvaal, known as the Bushveld, absorbing large areas of the Pretoria, Rustenburg, Waterberg, Middelburg, and Lydenburg districts, and seldom attaining an altitude of 5,000 ft. This series of rocks affords a notable instance of the phenomena presented by an extensive magma under conditions of slow cooling, one of the principal of which is the increasing basicity from centre to margin; for the series includes an infinite variety of rocks, from highly acidic granite to ultra basic pyroxenites and peridotes, with structures varying from coarsely crystalline to felsitic. The rock that up to the present has attracted most attention is the *Red Granite* (sometimes distinguished as the *New* Red Granite), which, from its association with the discoveries of tin and other base metals in this region, has led to its being frequently designated the Red Granite Area. The acid rocks occupying the centre of this huge complex consist mainly of granite and closely allied varieties. In the granite country the more low-lying ground is usually occupied by the coarser kinds, while on the higher ground the finer-grained kinds are met with. The intermediate zone of rock, syenitic for the most part, appears in typical instances to constitute a transitional phase between the granite and the basic occurrences at the margin of the mass. The basic rocks which constitute the margin generally form at their extreme periphery a belt of diabase type immediately in contact with the Magaliesberg quartzite of the Pretoria Series. A mile or so, however, from the extreme margin, the diabase gradually passes into varieties of gabbro and norite. To the north-east of Pretoria this basic zone dies out north of Hatherly, but when traced to the west it is found to follow the trend of the Magaliesberg Range past Rustenburg to near Zeerust, while east of Hatherly a similar zone traverses the Middelburg and Lydenburg districts, and crosses the Oliphants River into the vicinity of Pietpotgietersrust. In the norites occur narrow belts of magnetic, outcropping for long distances, and often from 10 ft. to 20 ft. thick, while deposits of iron-opal and chromite are occasionally met with. The percentage of iron in these deposits is higher than in any other known iron ore in the country, but a considerable proportion of titanic acid, in the magnetite at least, is at present an obstacle to economic exploitation of localities within reach of a railway. The ultra-basic rocks are encountered principally in the west of the Rustenburg district and in the Marico district.

The rocks of more strictly volcanic class consist mainly of felsitic rocks. Their geological position is still a matter of some uncertainty, as there is a liability to confuse them with other felsitic rocks, representing probably marginal modifications of the granite. In the opinion of some of our leading geologists the greater portion of this enormous mass of eruptive material was forced between the youngest beds of the Potchefstroom System and the overlying Waterberg Sandstones; thus it is likely that originally many hundreds of feet of strata must have rested on the top of the mass, which have since been almost entirely denuded. The geological term for an occurrence of this nature is a "laccolite." It was during the gradual cooling of the magma constituting the laccolite that the segregation-phenomena must have taken place. The date of this huge eruption has not been ascertained. In this connection it is interesting to note that between Schoongezicht, in the Middelburg district, and Schurvekop (north of Bethal), numerous outcrops and fragments of an acid igneous rock (closely allied to the Bushveld granite) run in an E.S.E. and W.N.W. direction. On Schurvekop is found a small boss of granite identical in appearance with the Bushveld granite. On Schoongezicht, beds belonging to the coal-measures are tilted and altered in a manner suggestive of these acid rocks being intrusive into them. Thus, whatever may have been the period during which the main laccolite was formed, it would appear that there must have been eruptions of rocks of that type after the coal-measures had been laid down. The contraction of the slowly-cooling mass of the laccolite caused numerous cracks and fissures, and several systems of very deep fissures have been met with in different parts of the red granite region. These doubtless formed vents or channels for

the escape of mineral-bearing gases and fluids, which, when they met with conditions producing precipitation, would yield up the minerals held in solution. The escaping gases caused what are known as *emanation lodes*, forming belts of a rock called greisen (composed mainly of fluormica and quartz), and enriching the fissures and their walls of country-rock with such minerals as cassiterite (tin ore), hamatite, molybdenite, quartz, zinnwaldite, muscovite, tourmaline, and fluorspar. This system of fissures is found in the regions occupied by the most coarsely crystallised types of the acid rocks, fresh occurrences of which are constantly being discovered, holding out the highest awards to the skilful and properly-equipped prospector, and to the intelligent investor.

The value of the ore deposits associated with the Bushveld Igneous Rocks is likely in time to prove exceptionally great, for, in addition to the iron ores already mentioned, tin exists in numerous places, copper is frequently met with over most of the area, and silver, cobalt, nickel, mercury, molybdenum, lead, and bismuth have been reported by prospectors; and in one of the copper ores the radium-bearing minerals carnotite and gummite have been found. The resources of this region first came prominently into notice when, early in 1904, oxide of tin (cassiterite) was found in fissures traversing the coarse red granite on the farm Enkeldoorn, some 42 miles north-east of Pretoria. Since that date prospecting in the neighbourhood has revealed large areas affording rich occurrences of the base metals. Active development work is being carried on, and small reduction plants are approaching completion for the purpose of demonstrating the payable nature of the ore occurrences. In addition to the heavily-mineralised area on the Enkeldoorn Spruit, Elands River, and Moss River to the north-east of Pretoria, success has attended the prospecting of the Rooiberg region, north-west of Warmbaths. The Selons River area, on the east bank of the Olifants, some 40 miles north-east of Middelburg, was worked more than 30 years ago for rich deposits of cobalt, nickel, copper, silver, and gold, and is to-day receiving renewed attention. Many parts of the Transvaal covered by the Bushveld rocks have scarcely been explored at all. It will take time to demonstrate if the good prospects already discovered can be developed into payable mines. If they can, a wonderful field will be opened to the miner.

Karroo System.

From the fact that the rocks of this system are the only ones that have as yet yielded determinable fossils, the Karroo formation is the most interesting one occurring in the Transvaal from a strictly geological point of view, as it is also alone in the possibility of being definitely correlated with European formations. It occurs over a very large proportion of the Transvaal, and is most in evidence in the south-eastern portion, where it attains its most extensive developments. It forms nearly the whole of the High Veld, from which region is derived the name ("Hooge Veld," or High Veld) given by Dr. Molengraaff to the upper series of the coal-measures in the Transvaal. The great eastern escarpment of the High Veld, on the Natal and Swaziland borders, affords magnificent sections of extensive series of strata forming part of this system. In its western, and particularly its northern extension, the Karroo System diminishes very considerably in thickness. The system is divided into the following three series (reckoning from above downwards):—

(1) The Upper Karroo, or Stormberg Series.
(2) The Middle Karroo, or Beaufort Series.
(3) The Lower Karroo, or Ecca Series.

Dr. Molengraaff's later views are represented by the following classification:—

Upper Karroo: Fluviatite and Lacustrine. Stormberg Beds, not developed in the Transvaal, containing coal seams in the Cape Colony.
Hooge Veld (High Veld) Series: Probably Beaufort Beds, containing coal seams in the Eastern Transvaal; thins out towards the west.
Lower Karroo: Glacial and interglacial. Ecca shales very well developed in the Eastern Transvaal, thinning out towards the west, and not developed at Vereeniging.
Dwyka Conglomerate, containing (locally) interglacial sandstones, with coal seams at Vereeniging.

Entitled to respect, however, as this pronouncement by Dr. Molengraaff undoubtedly is, the most recent memoir issued by the Transvaal Geological Survey ("The Geology of the Komati Poort Coalfield," April, 1906) places it practically beyond question that the Upper Karroo Series does occur in the Transvaal, in the bushveld of the Pretoria and Waterberg districts, in the extreme north of the Zoutpansberg district (where it is connected with the Tuli Coalfield of Southern Rhodesia), and along the whole of the Lebombo Range, from the Limpopo River on the north to the Zululand border on the south; and, further, that in at least one region of this last occurrence, viz., between the Sabi River Game Reserve and the northern boundary of Swaziland—the sedimentary beds of this and part of the Beaufort Series, together with the overlying volcanic rocks, reach a thickness of about 16,000 ft.

The Glacial Conglomerates—(Dwyka).—For a long time this rock was a puzzle to geologists, but its classification as a glacial formation has now been universally accepted. In the southern portions of the Cape Colony it has the characteristics of a sub-aqueous deposit composed of materials of glacial origin; in the northern portions (and in the Transvaal) it represents a true ground-moraine deposited by an ice-sheet of very great dimensions. The boulders are of infinitely various kinds, representing every one of the older formations—the rocks of which they are composed lying almost invariably *north* of the conglomerate occurrence. In the Transvaal this formation seldom attains a thickness of 300 ft., but in the Cape Colony it is as much as 1,300 ft. thick. Grooved and striated rocks occur at the base of the dwyka conglomerate in numerous districts, pointing to a general ice movement from N.N.W. to S.S.E.; and a fair proportion of the included boulders bear similar markings. The glacial conglomerate shares in the general thinning out of the whole system from east to west; its general appearance and the character of its matrix differs somewhat in the northern regions from the eastern occurrences.

The Ecca Series.—Rivers fed by glacial streams always carry in suspension quantities of fine mud and silt, resulting from the attrition of the boulders transported by the glacier. The material forming the Ecca Shales must have been thus laid down. This series is well developed along the great eastern escarpment of the High Veld, thins out westwards, and is often (as at Vereeniging) entirely absent. It is as yet hardly possible to say how it is represented in different regions of the Transvaal.

The Middle Karroo (High Veld) Series.—This series is at present

correlated with the Beaufort Beds of Cape Colony, the Orange River Colony, and Natal, and consists of grits, sandstones, and shales, more immediately associated with the coal-seams of the Transvaal. The present occurrences of these beds vary from 100 ft. to some 400 ft. in thickness, according to the amount of denudation they have experienced. In the Eastern Transvaal they attain a thickness of 700 ft. The measures lie almost invariably horizontal, or nearly so.

The Upper Karroo Series.—The work recently accomplished by the Transvaal Geological Survey tends materially to modify the views hitherto held concerning the presence in the Transvaal Colony of the Upper Karroo Series (usually correlated with the Stormberg Beds of Cape Colony, the Orange River Colony, and Natal), and its differentiation from the underlying measures of the High Veld (or Beaufort) Series. The Director of the Transvaal Geological Survey reports that he finds—in the region bounded by the Sabi Game Reserve on the north and the Swazi boundary on the south—lying unconformably on the old granite and belts of the Swaziland schists of the Archæan formation, three parallel outcrops of much younger rocks, with a north-south strike, and an average easterly dip of some 10°; the lower division consisting of sedimentary deposits belonging to the coal-measures, and the upper division being characterised by volcanic rocks of two different types—the entire series forming apparently a perfectly conformable concession from west to east. Summarising the evidence furnished, this series in its proper succession is found to occur within the Transvaal along the whole western face of the Lebombo Range (close to the Portuguese border), where its development seems to be greatest, in the Springbok Flats and the bushveld of the Pretoria and Waterberg districts, and in the extreme northern portion of the Zoutpansberg district (where it is connected with the Tuli Coalfield of Southern Rhodesia). Outside of the Transvaal it occurs in Zululand as the St. Lucia Coalfield, as the upper formation of the Drakensberg Range in the Cape Colony and Natal, and in the Caledon River regions in the Orange River Colony. Should the correlation of the stratified deposits and of the basic lavas in these different and widely-separated areas be definitely established, we shall have evidence at the close of the Karroo times of a period of volcanic activity truly remarkable for the vast extent of the region throughout which it was manifested. The Komati Poort coal-measures rest, with a very marked unconformity, upon a floor of the rocks of the Archæan System and upon the old granite. The thickness of the entire sedimentary series has been estimated at about 3,200 ft. The coal-bearing measures themselves account for some 3,000 ft., and it is anticipated that palæontological evidence will soon be forthcoming that the uppermost portion of these may be representatives of the Molteno beds, while the lower portion represents the Beaufort horizon. Fragmentary plant remains have been found in the Komati Poort coal-measures that are considered to include *Vertebraria* (*Glossopteris rhizome*), indicating a parallelism with the Beaufort Beds. If the Komati Poort Series be followed to the south through Swaziland, it will be found practically to extend to the St. Lucia Coalfield, and to be continuous towards the west with the coal-deposits of the Vryheid district. Associated with the Glossopteris and Phyllotheca in the St. Lucia Beds there is also recorded an example of *Tæniopteris daintreei*; and it must be realised that no Tæniopterid forms are as yet known in South Africa from a lower horizon than the Molteno Beds. The Komati Poort coal-measures proper include numerous intrusive sheets of igneous rock, whilst coal-seams of varying thickness have been found at intervals throughout the upper portion of the series. Overlying the coal-measures proper, and forming a constant, though narrow, zone between them and the lower division of the volcanic rocks, occurs a fine-grained sandstone of a markedly massive unbedded character, with red and green marls and shales at its base, and with occasional occurrences of calcareous breccia. The thickness of this zone does not exceed 300 ft. The sandstone is precisely similar to an occurrence on the Springbok Flats, where it is overlaid by the Bushveld Amygdaloidal Basalt, closely resembling the basic lavas of the Lebombo. There can be hardly any doubt but that this sandstone, designated the "Bushveld" sandstone by the Transvaal Geological Survey, is the Transvaal equivalent of the cave sandstone of the Stormberg Series, and that the red and green marls are the equivalents of the red beds of the same series. Conformable with this, the topmost sedimentary deposit of the Karroo System, occurs immediately overlying it the Amygdaloidal basalts, and in succession above these come the Rhyolites of the Lebombo Range. The older of these two divisions occupies the low-lying strip of country immediately west of the Lebombo mountains. It is estimated to have a thickness of approximately 6,000 ft. These basic volcanic rocks are traversed by numerous intrusions (both dykes and sheets), also of a basic character, and the normal varieties closely resemble the Bushveld Amygdaloids of the Springbok Flats. The younger division consists of acid lavas of rhyolitic type forming the conspicuous escarpment of the Lebombo Range itself. These rocks have an average dip eastward of 10°, and are known to extend to a considerable distance within the Portuguese boundary. Their thickness is considerable, and may probably be estimated at a minimum of 6,000 ft.

The Coal Seams.—Considerable divergence of opinion exists as to the precise horizon in which occur the coal-seams of the Transvaal, some placing them in the Ecca Series, others in the Beaufort Series. The contributors to the proceedings of the Geological Society of South Africa appear to be divided on the point. The members of the Transvaal Geological Survey apparently favour the Beaufort Series view; the Natal Government Geologist classes them—but on apparently insufficiently grounds—as Ecca Series. Many of the Transvaal coal deposits are generally taken to be of glacial, or interglacial, deposition. Fossil plants are abundant, and unmistakably of Permo-Carboniferous age. The more typical are *Glossopteris browniana* (two varieties), *Gangamopteris cyclopteroides*, *Neuropteridium validum*, *Neoggerathiopsis hislopi*, *Bothrodendron leslii*, *Sphenopteris*, *Sigillaria brardi*, etc. The origin of the bulk of the coal in the Transvaal may unquestionably be ascribed to the sedimentary deposition of the fragmentary remains of the luxuriant vegetation which flourished during the Karroo period. The constant interlamination of the coal with carbonaceous shale (the cause of the nearly universal high percentage of ash), the gradual passage from coal to shale, and the absence of any true underclay on which the plants could have grown, all point to the drift origin of the coal. The amount of marketable coal in the Transvaal must be enormous, in spite of the seams having been destroyed or seriously damaged over large areas by igneous rock. The important coal-producing localities are: At Vereeniging, where the Central South African Railways line crosses the Vaal River into the Orange River Colony; at Boksburg and Springs, east of Johannesburg; at a large group of collieries near Witbank station, west of Middelburg;

and at Belfast. Transvaal coal has not the superior quality of Welsh coal, its calorific power varying from about 12·5 to 9·5 lbs. of water evaporated from and at 212° Fahr. per lb. of coal. It is characterised by a large amount of ash—seldom less than 10 per cent.—this being a feature in all South African coals. Compared with the Welsh steam coal, the percentage of fixed carbon is low, while the percentage of volatile matter is high. The best coal mined in South Africa at present probably comes from Dundee and Newcastle, in Natal; in the Transvaal the Middelburg and Ermelo coals have the best reputation. Hatch and Corstorphine give the following as a typical succession of the coal-measures in the Springs basin:—

Surface soil	91 ft.
White sandstone	4 ,,
Black shale, sandstone, yellow and blue clay ..	31 ,,
Coal	10 ,,
Grey sandstone, dark clay, and shale	12 ,,
Coal	10 ,,
Black shale, sandstone, grit and breccia, with seams of inferior coal	26 ,,
Coal (shaley)	10 ,,
Black sandstone and shale, with a 6 in. coal seam ..	38 ,,
Sandstones, grits, and shales	52 ,,
Dwyka conglomerate ..	1 ,,
	285 ft.

Turning to the official geological report upon the Lebombo coal-measures, it is quite clear that many more seams of coal exist in these beds than is evident from a survey of the surface and from the prospecting work done; nor can the coal at present formed be taken as a reliable guide in other parts of the carboniferous area. The report states that a selected sample of the coal outcropping on the bank of the Crocodile River near Komati Poort yielded an analysis distinctly promising, and comparing favourably with some of the better-class High Veld coals, such as Witbank. Some coal exposed near Tenbosch station is practically of no commercial value, owing to the very high percentage of ash, and low calorific value. Coal from a borehole near Furley's Drift has a strong anthracitic tendency, but a high percentage of ash. The results of analysis are, however, very encouraging for further development. In contrast with these somewhat negative results are analyses of the coal obtained in the extreme north-east corner of Swaziland. These analyses compare in every way favourably with those of Welsh steam coal. When it is remembered that the Swaziland Coalfield is a direct continuation of that of Komati Poort, it is perhaps not too much to expect that further development of the latter may bring to light the existence of coal of as high a quality as that stated to occur in Swaziland.

In the Ermelo district there is an extensive occurrence of oil-shale, which gives every promise of being of economic value. The shale-bed occurs in the same way and in the same horizon as the coal-seams, being separated only by a narrow band of white sandstone from 4 ft. of the best smithy coal yet discovered in South Africa. Some 80 ft. above this occurrence lies another thick seam of coal of very good average quality. Boring for petroleum, in the hope of striking wells of oil, has been attempted in many districts of South Africa where the Karroo formation occurs, and prospecting of this nature has been attempted in the Wakkerstroom district of the Transvaal, but up to the present results have been indifferent.

The further economic value of the Transvaal coal-measures lies to-day solely in the excellence of their freestone. Gold has been known to occur (for instance, at the outlier on the farm Waterval, some 15 miles north of Pretoria) in a band of iron-pyrites in a coal seam.

Bushveld Amygdaloid, Lebombo Lavas, and other Igneous Rocks.

A wide area of the more northerly portions of the region occupied by the Igneous Series of the Bushveld is remarkable for a large flow of basic lava, termed the Bushveld Amygdaloidal Rocks. This area corresponds mainly with the tract known as the Springbok Flats. It is a level plain on which outcrops are exceedingly scarce, but the rock at a depth is seen to be of a basic igneous character containing numerous amygdules, mainly of calcite and of the zeolites. It is easily decomposed, and forms a dark, sticky, rich-looking soil. Boring has been undertaken by the Government in the hope of striking artesian water, a small amount of which has been encountered, but not sufficient to permit of the undertaking of extensive irrigation. The decomposed amygdaloid makes a most fertile soil; with sufficient water this would become a magnificent agricultural district. No importance is at present attached to the mineral resources of the region. The age of the rocks is presumed to be comparatively recent as Transvaal geology goes. A leading authority suggests that they represent the closing phases of the period during which the Bushveld complex was erupted. Evidence collected by the Transvaal Geological Survey points rather to this flow being younger than some series of the Karroo System. The Bushveld amygdaloidal lava is held by some observers to bear considerable resemblance to lava intrusive in the Stormberg Beds in other parts of South Africa.

The whole of the eastern border of the Transvaal, and of Swaziland, contributes a very marked geological feature of South-Eastern Africa in the Lebombo range of hills, which divide the low plains of the littoral wherein are developed the various coast systems of South African geology from the rolling country of the Transvaal Low Veld. The Lebombo Range starts from the northern part of Zululand, and is formed of rhyolitic lavas, which can be traced many hundreds of miles northwards through Portuguese and German territory into the interior of Central Africa. In the Transvaal the volcanic series of the Lebombo Range with its underlying sedimentary rocks rests with a very marked unconformity upon the Old Granite or upon Swaziland Schists. The dip of the whole volcanic and sedimentary formation is about 10° to the east.

It is now pretty well established that the Bushveld amygdaloidal lavas and the volcanic series of the Lebombo are the Transvaal representatives of the volcanic series forming the topmost horizon of the Karroo System—under which heading the rocks of this chapter are more particularly treated of.

The Diamond Pipes.

Diamond pipes are usually considered to be the vents of extinct mud-volcanoes, but the manner in which the pipes, and the contained diamonds, were formed is not yet understood. The diamond-bearing rock petro-logically known as *Kimberlite* is of a highly basic nature, and may be described as a serpentinous breccia. In its unoxidised condition it is of a bluish-green colour, but when decomposed by atmospheric agencies it is yellow, and usually disintegrates very rapidly. The following list includes most of the constituents that have been noted in Kimberlite:—Augite, barite (as a secondary formation at the junction of the "blue" ground with the country rock), biotite, bronzite, calcite, chlorite, chrome-diopside, corundum, enstatite, garnet, hornblende, iron ores (in the form of chromite,

magnetite, and ilmenite), kyanite, magnesite, mica, olivine, perofskite, pyrope, quartz-crystals, smaragdite, tourmaline, zircon. The constituents usually encountered on the surface of a diamond-bearing deposit, or of a pipe, and looked for by diamond prospectors, are the two minerals that do not weather so easily as the others—ilmenite (titanic iron, the "carbon" of the miner) and garnet. The chrome diopside is readily distinguished by its green colour. Olivine is always abundant, but being often much serpentised has lost its characteristic appearance. Zircon is sometimes mistaken for diamond, but it is not so hard, is usually of a yellowish colour, and has a different form of crystal. The characteristics of Kimberlite are found to differ somewhat in different mines. The pipes are mostly of rough circular shape, with (almost invariably) a decrease in their area at a considerable depth. Kimberlite also occurs in veins or fissures (usually vertical, and often extending thousands of feet) in the country-rock, and sometimes as dykes. Many pipes have fissures branching out from them, and in several cases the mine appears to be merely an enlarged vent in the line of fissures. Pipes, fissures, and volcanic necks containing ultra-basic breccia substantially the same as Kimberlite are found penetrating stratified, crystalline, and intrusive rocks of all ages up to the dolerites intrusive in the Karroo System, the youngest rocks known to be penetrated belonging to the Stormberg Series; and it is not improbable that the diamond-bearing rocks of South Africa may prove to be of an age later than Lower Cretaceous. Embedded in the Kimberlite are usually found fragments of the rocks forming the surrounding strata, as well as of those through which the volcanic vent has penetrated at depth. In miner's parlance, the country-rock in which the pipe occurs is termed "reef"; the larger masses of country-rock included in the breccia, "floating reef"; and the fragments, "boulders." The diamonds are generally colourless, but yellow, blue, pink, green, brown, and black diamonds of all shades are found. Every mine has its peculiarities, and an expert can readily distinguish between the diamonds from one pipe and those from another, as also between a "mine" stone and a "river" stone (the term used for diamonds won from the alluvial deposit). Every mine produces a larger or smaller proportion of diamonds of poor quality which are valueless as gems, but are used for polishing and in some instances for diamond-drilling.

Diamonds were known very early in the history of the River Diggings—of the later sixties—to occur in the alluvial deposits of the Vaal River near Christiana, in the extreme south-west of the Transvaal. The first discovery in the Pretoria district dates back to 1868, when some diamonds were found in the Elands River. The first pipe was located in 1897, Mr. Schuller and Mr. David Draper making the momentous discovery on Rietfontein, east of Pretoria; but it is only since 1902 that the value of the Transvaal mines has been clearly demonstrated. Several diamondiferous vents are now known to the east of Pretoria, and are situated on the elevated ground occupied by some of the uppermost quartzites, shales, and diabase of the Magaliesberg beds of the Potchefstroom System. Of these, the Premier Pipe is not only by far the largest known diamondiferous vent in the world, but it has produced a most marvellous record in diamonds, including the world-famed Cullinan diamond—the largest yet known. Apart from the Premier pipe, the other mines are of comparatively small size. They may be enumerated as the Schuller—consisting mainly of "hardibank" (a species of Kimberlite that weathers with great difficulty), and therefore unpayable under present conditions—Kaalfontein, Zonderwater, Pienaarsport mines, and the Montrose mine on Wryneb. The known length of this last pipe has recently been demonstrated to be over 1,500 yards, and there is good promise of a big mine being opened up. Mention must be made of the diamondiferous alluvial deposits in the Pretoria district, which occur along the various streams leading from these pipes. One curious and very interesting occurrence of diamonds is to be noted near Klerksdorp, where green diamonds have been found in a gold-bearing banket worked by the Klerksdorp Gold and Diamond Company, Ltd. The facts connected with these stones point to the probability of the existence in the Transvaal of a diamondiferous matrix of a much earlier geological age than any pipe yet found. The green diamonds occur in conglomerate that is certainly not younger than of Black Reef age, and it is evident that, to be incorporated in this conglomerate, the diamonds must have been formed at a still earlier geological period. Another point suggesting the possibility of some matrix of the diamond other than the volcanic vents already described, is the fact that the "river stones"—*i.e.*, the diamonds found in the alluvial deposits of the Vaal River between Klip Spruit (Wolmaransstad district) and Barkly West (Cape Colony)—possess different characteristics from and are invariably of very much better quality than any average parcel of stones found in any of the diamond mines in South Africa. It appears almost as if the matrix of these and of the Klerksdorp green diamonds might be found in the igneous complex of the Ventersdorp Series.

Alluvial mining for diamonds is an old-established industry in the Bloemhof district, Transvaal, and supplies a steady output of stones of high quality. Reports that cannot be ignored have from time to time been made of the discovery of diamonds in the Rustenburg, Zeerust, Lydenburg, and Zoutpansberg districts, as well as on the borders of the Bechuanaland district, Cape Colony; but no definite results have so far been obtained by prospectors.

Recent and Superficial Deposits.

No sedimentary deposits younger than the Karroo System have yet been found in the Transvaal, but some of the recent superficial deposits are of economic importance, while others are of some geological interest. From the purely geological standpoint, a calcareous tufa covering large areas in the Bloemhof and Wolmaransstad districts is worthy of mention. It appears to owe its origin to the line contained in underlying igneous rocks of basic type, and capillary action has been credited with drawing the lime-charged water to the surface, where it undergoes evaporation. From the same standpoint certain interest attaches to considerable deposits of laterite, a recently-formed honeycombed stone known amongst the Boers as "ou' klip," or "oudeklip," which in places is so rich in iron (in the form of a kind of bog iron ore) that it may in future prove of economic value. It has been formed in "pans" and pools of stagnant water by the cementing of gravel and silt with hydrous oxide of iron. The alluvium, or river-wash, is the only superficial deposit in the Transvaal that has up to the present assumed industrial importance. The alluvial gold deposits of the Blyde River watershed in the Lydenburg district were of sufficient richness to attract a considerable rush of diggers from many parts of the world to South Africa in the early seventies, and from first to last a large amount has been won in that region. A serious blow was given to this class of mining by the policy pursued by the Boer Government in 1881 of granting large areas in the Lydenburg Gold-

fields under "concession." In addition to many places in the Lydenburg district, large areas in the Kaapsche Hoop and Barberton Goldfields, and in their vicinity, are proved to contain alluvial gold payable in patches. In all these localities the principal source of the gold seems to have been the rocks of the Black Reef and Dolomite horizons, as well as some of the Pretoria Series; secondarily, the schistose rocks of the Archæan System have been the matrix of the gold. At Marabasstad and at the Thabina River (Zoutpansberg district) the origin of the alluvial gold may be looked for also in the Archæan System. In the Kaap Valley, Barberton Goldfields, the river-wash has been ascertained to contain in places good value in the "black sands," and experiment is now being made to collect and treat these auriferous black sands on a commercial basis. Near Blaauwbank, some 18 miles west of Krugersdorp, and at Vogelstruisfontein and Rietfontein, some 35 miles west, there has been intermittently worked for a good many years alluvial and "shed" gold that has been derived from rocks of the Lower Pretoria Series. It is probable that profitable mining in these localities would follow were the systematic storage and distribution of water undertaken.

The decomposition of rocks of the Swaziland schists series is answerable for widely-scattered patches of alluvial tin in the portions of the Carolina and Ermelo districts near the Swazi border, and in Swaziland itself. Alluvial tin-mining is being carried on at a commercial profit, and may hold out encouragement for further prospecting. The decomposition of the new Red Granite and of allied rocks of the Bushveld Igneous Complex is known to furnish gravels and stream washes containing alluvial tin. Steps are being taken in the Pretoria Bushveld area to prospect these superficial deposits, and it is hoped that the enterprise may be sufficiently successful to induce systematic prospecting in this and other promising localities.

Alluvial diamond-mining is being carried on in two localities in the Transvaal—at Christiana on the Vaal River, and near the Premier Diamond Mine. At a third spot—the junction of the Klip Spruit with the Vaal River, Wolmaransstad district—stones of good quality have been found.

The river drifts of the Transvaal and Swaziland have been found to contain ancient stone implements, from the study of which some day may be inferred the relative ages of certain of the superficial deposits, but up to the present the knowledge gained has had no practical bearing upon South African geology. It is claimed that the implements recognised fall into three distinct groups—the Eolithic (the earliest), the Palæolithic, and the Neolithic. Comparison has been made with typical forms secured in the basin of the Thames, and the inference has been drawn that South Africa must have seen much the same evolution in the progression of its Stone Ages (especially of the most recent) as did Britain and the west of Europe; further, the conclusion is arrived at that such progress must have taken approximately equal periods of time. It seems probable, on the whole, that the Stone Age occurred much more recently in South Africa than in Europe; but there are many evidences that South Africa has been a land surface since the youngest Karroo Beds were deposited, and it is not surprising that students of this branch of Archæology should claim that a great antiquity is shown by the geological evidence of many implement-bearing patches of old river deposits.

The Witwatersrand Gold Mines.

PRODUCTION.

IN describing and discussing the Witwatersrand Gold Industry, from any point of view, it is a great help to summarise briefly what has been done in the past, and in no aspect of the position is this more important than in reviewing the gold production or output of the mines. The following figures from Hatch & Corstorphine's book give the amount and value of gold won from the year 1887 to the end of 1905, together with the yield per ton in dwts. of fine gold :—

Year.	*Tons milled.*	*Ounces fine gold.*	*Value sterling.*	*Yield per ton in dwts. of fine gold.*
			£	
1887	(Not recorded.)	19,079	81,045	—
1888	,,	171,789	729,715	—
1889	,,	306,166	1,300,514	16·20
1890	702,828	408,569	1,735,491	11·63
1891	1,175,465	601,810	2,556,328	10·24
1892	1,921,260	1,011,743	4,297,610	10·53
1893	2,215,413	1,221,171	5,187,206	11·02
1894	2,827,365	1,639,264	6,963,100	11·60
1895	3,456,575	1,845,890	7,840,779	10·70
1896	4,011,697	1,851,430	7,864,341	9·23
1897	5,325,355	2,491,613	10,583,616	9·36
1898	7,331,446	3,614,385	15,141,376	9·86
1899	6,763,533	3,599,945	15,089,561	10·64
1900	552,929	351,507	1,464,634	12·71
1901	412,006	238,994	1,014,687	11·60
1902	3,416,813	1,690,100	7,179,074	9·89
1903	6,105,016	2,859,482	12,146,307	9·37
1904	8,058,295	3,658,241	15,539,219	9·08
1905	11,160,422	4,706,433	19,991,658	8·42

The table shows a steady increase in the tonnage milled and value of gold obtained, with a corresponding decrease in the value per ton treated. The period 1899 to 1902 was, of course, affected by the war, and the high value per ton treated was owing to the fact that only the rich portions of the richer mines were worked during those years. As these remarks are intended mainly to deal with the present aspect of the Witwatersrand Gold Industry, facts relating to the past history of the fields will be dealt with as briefly as possible.

There were 64 producing mines on the Witwatersrand in May, 1906, dropping in all 7,285 stamps, and returning gold to the value of £1,877,225. The average value returned was 34s. per ton milled, while the average working costs and profits on the same basis were respectively 22s. 8d. and 11s. 4d. These are the broad features of the situation at the present time, and it is on these figures that this review is based.

The present position of the industry is dealt with under the following heads :—

(1) Outcrop mines; first row "deep-level" mines; "deeper-deep" ventures—their respective peculiarities and profit-earning capacities.
(2) The outputs and profits of producing mines; the equipments and market prices of the leading gold-mining companies.
(3) Prospecting; the diamond-drill; the importance of bore-holes in proving the extension on both dip and strike of the Main Reef Series.
(4) The "life" of the Witwatersrand Goldfields.
(5) The cost of equipping a mine; the expenses incurred in sinking deep-level shafts; other problems.
(6) Mining features and problems; mechanical features.
(7) Metallurgical features.
(8) Financial features, with special reference to the "group" system.
(9) The "group" system; the more prominent companies controlled by each group; the advantages accruing from the system.
(10) The valuation of gold mines; principles and methods of valuing.
(11) The cost of coal, stores, etc., for the mines.
(12) The rate of wages paid to the white workers; the social conditions obtaining on the mines; the relative efficiency of "Kaffir" and "coolie" labour.

(I.) OUTCROPS.

The outcrop of the Main Reef Series can be traced with occasional breaks from the Stubbs Randfontein (the most distant of the Robinson subsidiaries) in the west to the New Modderfontein on the east. At the present time there is not an unbroken line of mines working along this outcrop, but it is only fair to state that this is in some cases due to labour difficulties rather than to absence of gold-bearing reefs. Between the Robinson Randfontein and the Lancaster Mine on the west there is a gap of some five or six miles unworked. This ground is held by subsidiary companies of the Randfontein Estates, and by the West Rand mines. The reef has, however, been traced throughout these properties, and has in places been opened up, showing excellent values—more particularly on the Van Hulsteyn Randfontein and Ferguson Randfontein claims. Labour difficulties are mainly responsible for these properties lying idle. The group of mines adjacent to Krugersdorp, of which the Lancaster property is a type, are distinguished by several of them working at a profit two distinct series of reefs, the Botha Series and the Battery Series. It is generally recognised that the Botha reefs are identical with the Main Reef Series, and the Battery reefs with the Kimberley Series. From the Lancaster, proceeding east, there is an unbroken line of producing mines (too numerous to mention) as far as the French Rand mine. To the east of the French Rand is Grey's Mynpacht, which lies within the area affected by the "Witpoortje Break"—by which is designated a considerable tract of "faulted country" to the west of Roodepoort village. A good deal of work was done on Grey's Mynpacht prior to the war, a stamp mill was erected, and crushing operations were carried on for some time, but with very disappointing results. Since the war the mine was unwatered and carefully sampled on behalf of the Albu group, but the outcome was the reverse of encouraging. The reef is much faulted and of low grade, and it is questioned by some whether or not the ore-body worked was really the same as that being exploited by the adjoining French Rand mine. The geology of the "Witpoortje Break" is still a matter of

THE PROPERTY OF THE ROBINSON GOLD-MINING COMPANY—the premier "show" mine of the Rand.

controversy, but it is generally agreed that the reef series worked on either side of it are identical. To the east of this region of disturbance the first developed ground belongs to the Saxon Gold-mining Company. This venture has opened up a considerable tonnage of payable ore, but financial difficulties have delayed the erection of a reduction plant. As might be expected, the mine is troubled by "faults," but not to such an extent as to make profitable exploitation impossible. From the Saxon, after traversing the claims of the West Roodepoort company, one arrives at the Princess mine and the various Roodepoort companies. The South Reef, the principal gold-carrier in this district, is a very thin but rich body, and has been worked with great success by the Durban Roodepoort, and Roodepoort United Gold-mining Companies—the average grade of these mines being considerably above the average of the fields. The most easterly of the Roodepoort companies—the Roodepoort Gold-mining Company—owns a large property, having absorbed the old Kimberley Roodepoort and other claims. Here the value of the reef shows, as far as present developments have proceeded, a falling-off in value compared with the adjoining companies on the west. The ground is much broken, but as depth is attained values have improved, and the outlook is more promising.

The Roodepoort Gold-mining Company's property marks the western boundary of a section of the Rand that is undoubtedly low-grade. From here, travelling eastward as far as the property of the Crown Reef Gold-mining Company, near Johannesburg—a distance of no less than eight miles—the values of the reefs have proved distinctly below the average of the Rand. Of the outcrop properties on this stretch of low-grade propositions, the Vogelstruis Estate and Gold-mining Company works a thin rich reef, having therefore the same characteristics as the other mines of the Roodepoort district. It is quite a payable concern, but does not show such good values as the other outcrop Roodepoort companies that are now crushing. Work is confined to the western side of the claims, and as the reef makes to the east a marked depreciation in value sets in, until, on the Bantjes Consolidated, results have proved so poor that these many years no attempt has been made seriously to develop the claims. There is no doubt that there are payable zones or patches in this property, but economic conditions and the general outlook will have to become far more favourable before this mine will be again unwatered. Beyond the Bantjes Consolidated are two small properties, the Aurora West and the New Unified. The Aurora West has a mill erected, and the mine is adequately developed, but lack of unskilled underground labour keeps this venture at a standstill. The New Unified has been crushing steadily for some years, but its profits are small, scarcity of labour and other difficulties rendering the prospect a somewhat precarious one. This is a section of the Rand where a reduction of working costs of 2s. or 3s. per ton would make a very great difference in the outlook, and it is to be hoped that economies marked enough to effect this will soon be brought about. The Consolidated Main Reef and Estate Company's property is the next mine eastward along the outcrop. Here a distinct improvement in profit is noticeable. Although a low-grade mine, it has been making substantial profits from the time the mill started after the war, and its future appears assured. This Company owns the freehold of the farm

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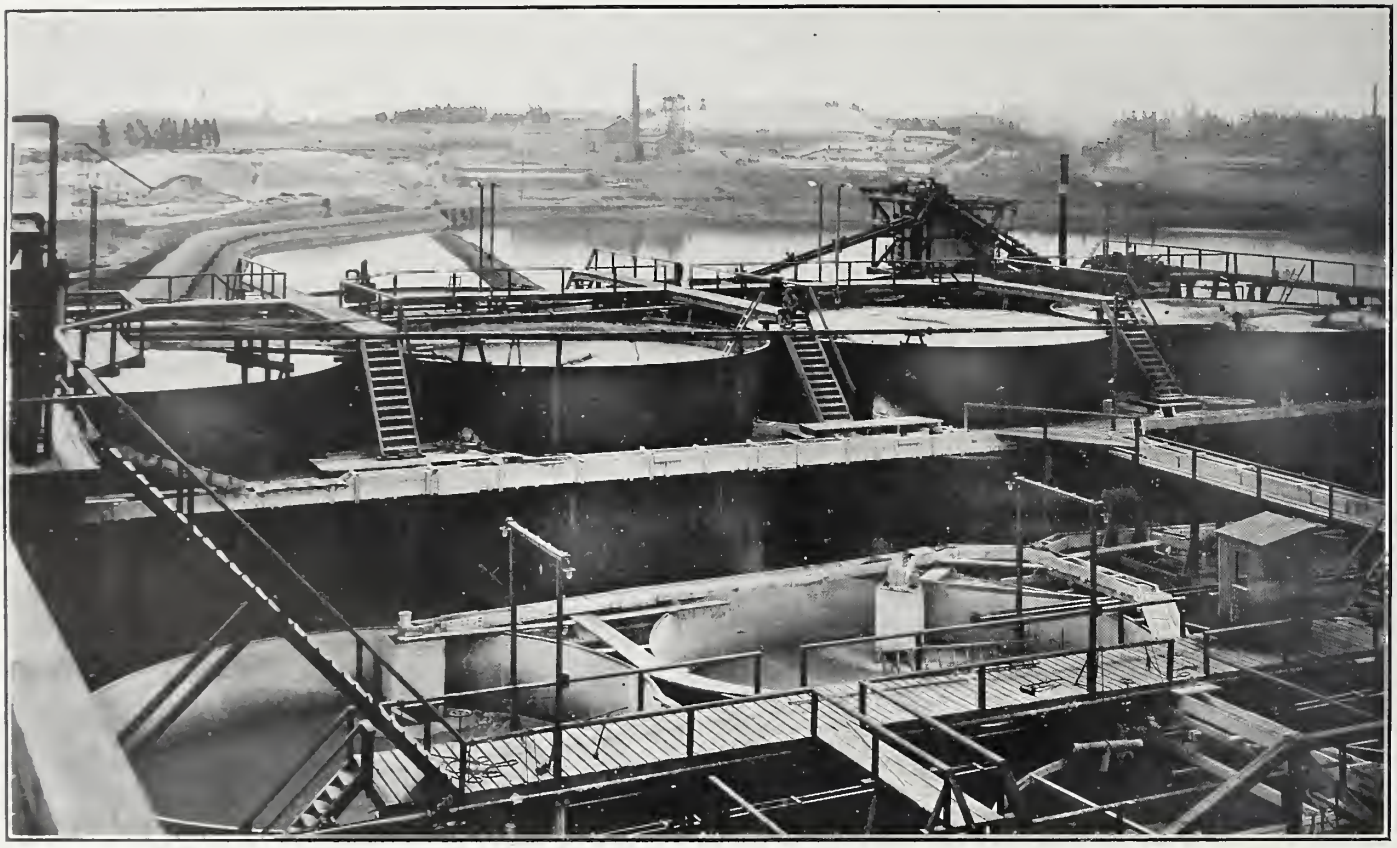
Paardekraal, together with the township of Maraisburg, and derives a considerable income from rents and claim licences. Quite a number of the outcrop companies already noticed derive incomes from similar sources: for example, the Luipaardsvlei Estate and Gold-mining Company, Ltd., Vogelstruis Estate, and the Bantjes Consolidated. Others are the City & Suburban, the Geldenhuis Estate, and the Witwatersrand Gold-mining Companies. Leaving the Consolidated Main Reef, the Consolidated Langlaagte comes next. It is an amalgamation of the "Langlaagte-Star" and "New Crœsus" properties. Individually these two mines have never achieved much success, but now as an amalgamated company, with an up-to-date equipment, they are making very fair profits; if run with native labour instead of the more expensive Chinese coolies the Consolidated Langlaagte would compare not unfavourably with the Consolidated Main Reef mines. Between the Consolidated Langlaagte and the Langlaagte Estate there are the Langlaagte "Block B," the United Langlaagte ("U.L.") Syndicate, and the Paarl Central companies' properties, all of which are at present idle. They, too, are of low-grade, but with sufficient labour and modern equipment could be worked at a profit. The Paarl Central struggled on for years before the war, but never earned sufficient to declare a dividend; its operations have been suspended for a long time, and will require, like many other properties in like position, a considerable cash outlay to re-start it as a prodneer.

With the next property, the Langlaagte Estate, one enters the rich central section of the Rand. The Langlaagte Estate, although it has never given a high return per ton milled, has been able to work large reefs, with correspondingly low costs, and has been a consistent dividend-payer from the early days. The Crown Reef, adjoining it, brings one on to the richest region of the Rand Goldfields. From here, through the Pioneer, Bonanza, and Robinson, to the Ferreira and Wemmer mines, are situated the companies that have from the earliest history of the Witwatersrand proved highly payable ventures. Both the Main Reef Leader and South Reef are profitably worked throughout these properties, and even the Main Reef has in many places been worked to advantage. The Pioneer and Bonanza, both small properties, are now exhausted, but were marvellously rich, the average return from the Pioneer having been over an ounce to the ton. The Salisbury, the Jubilee, the City & Suburban, and the Meyer & Charlton properties are the next along our course. Although markedly below the value of such mines as the Ferreira and Robinson, they have always proved profitable investments. The Wolhuter, although patches of high value occur in it, must be considered quite a low-grade proposition; while the Spes Bona, in addition to very low values, is so much "faulted" as never yet to have been worked profitably. The New Goch is another disappointing property. It has worked intermittently for many years, but has never done much more than pay expenses. It now has, with an up-to-date plant, adequate development below a zone distinguished by unusual faulting, and the position appears more hopeful, but in view of the heavy debt shareholders will still have to wait some time before they can obtain dividends. The Henry Nourse, immediately beyond the Goch, is a high-grade mine, and has always done well. Its best ore is now exhausted, and it is amalgamated with the Nourse Deep,



THE CYANIDE WORKS, ROBINSON DEEP.

A FURNACE IN THE CHLORINATION WORKS, ROBINSON GOLD-MINING COMPANY, LTD.

the new company being called the Nourse Mines. The New Heriot did very well in its earliest history, but of late years the grade has fallen considerably. This mine has, since the war, been one of the great disappointments of the "Kaffir market."

From here eastwards extends a long stretch of mines, some of average and some of rather low-grade, but they are all being worked at a profit. They are: the Jumpers, Treasury, Geldenhuis Estate, Geldenhuis Main Reef, Simmer & Jack, New Primrose, May Consolidated, Glencairn Main Reef, Witwatersrand, Balmoral, and Ginsberg—the three last-mentioned mines lying in a poorer zone. The Balmoral, which has never proved very successful, has recently been purchased by the Ginsberg.

East of the Witwatersrand Gold-mining Company's property (in early days known as "Knights") only one gold-carrier of the Main Reef Series is mined, the other "leaders" either dying out or becoming too poor to work. In this mine, and eastwards, there is a duplication of the reef which outcrops twice; the reef at the northern or original outcrop goes down a few hundred feet on the dip, and is then faulted up again to surface. This duplication extends as far as Boksburg, into the East Rand Proprietary mines, and has often led to considerable confusion, as it has caused the mistaken belief that there are two payable reefs in this section of the Rand. On the Witwatersrand Gold-mining Company's property there are two duplications, and consequently three outcrops. This necessitates communication by long crosscuts underground, and renders the mining costs rather high.

Beyond the Ginsberg are the four subsidiaries of the East Rand Proprietary Mines—Driefontein Consolidated, the Angelo, the New Comet, and the Cason Mines. Of these the Driefontein has done well in the past, but of late the developments have been very disappointing. The Angelo has been a high-grade mine, but it is becoming doubtful whether the returns of the past can be maintained. The Comet has produced ore of only medium grade, but the latest developments promise better results. The Cason has only just begun crushing; from development figures it should prove one of the richest mines on the fields, at any rate for the first few years of its life. Beyond the Cason are two small subsidiaries of the East Rand Proprietary Mines—the Cinderella and the New Blue Sky. These will eventually be amalgamated, together with other adjacent claims of the group, into a larger subsidiary company. Little work has been done on these properties, and values obtained up to the present have been very variable.

At this point the outcrop is lost under the much more recent strata of Karroo formation (coal-measures) covering the eastern portion of Leeuwpoort and the greater part of the farm Rietfontein. Our knowledge of the trend of the sub-outcrop in this area has been obtainable mainly by boring. A large number of boreholes have been put down on these two farms by the Boksburg Gold Mines and the Apex Mine. The reef has been struck at

many spots, but usually with rather disappointing results.

In one or two prospecting shafts sunk through the Karroo Beds on the Boksburg Gold Mines good assays have been obtained, and other boreholes put down by the East Rand Extension, Van Dyk, and Rand Collieries ventures, to strike the reef in depth, have encountered high values. The district remains a speculative one, but there appears little doubt that in places the reef is of excellent grade.

To the north of the Apex Mine the outcrop again shows on the Benoni and Chimes West properties—two mines not now in the list of producers. The New Kleinfontein, New Modderfontein, and Van Ryn gold properties are all equipped with modern plants, and are well established and profitable concerns, giving a grade equal to about the average now obtaining on these fields. Beyond the Van Ryn the outcrop is again lost under more recent sedimentary beds, and re-appears at surface only near the Nigel mine, many miles away to the south. Work in this area has been mainly confined to boreholes, excepting on the Geduld and Cloverfield properties, to which further reference will be made.

Deep Levels.

Whereas the "outcrops" form an almost unbroken line of producing or actively developing mines from one end of the Rand to the other, there are many wide gaps in the line of deep-level propositions. These properties are all held under claim licences, and the blocks of claims have as a rule been floated into companies, but in very many of them no active work has yet been begun.

Starting afresh at the extreme West Rand, the first property is that held by the Western Rand Estates, to the south-west of Randfontein. Here the presence of reef affording payable assays from drill-cores has been demonstrated, apparently, in the Witwatersrand geological formation underlying the more recent Dolomite formation. It was at first taken for granted that this reef belonged to the Main Reef Series, but it is now argued by some that it is either Black Reef or else the Steyn Estate Reef. This Steyn Estate Reef is to-day generally recognised as belonging to the Vaal River System, whilst the Black Reef forms part of the Potchefstroom System (a considerably younger geological horizon). The Main Reef, of course, is the most important member of the Witwatersrand System, so it is apparent that there is very little really known as to the true position of Western Rand Estates gold-earriers. In view of further rich reefs quite recently struck near the base of the Black Reef Series, the problem will probably be very keenly debated in the near future.

On the dip of the Randfontein subsidiaries but little boring has been done. The South Randfontein Deep struck the reef at a depth of nearly 4,000 ft., the assays not being very encouraging, whilst on the Randfontein Deep claims two or three holes have been put down with rather inconclusive results. The dip of the formation in this section of the Rand is so steep, averaging over 65° that the reef can only be encountered in the deep-levels properties at great distances below the surface. A good deal of work was done in the earlier

THE TANK-HOUSE, CHLORINATION WORKS, ROBINSON GOLD-MINING COMPANY, LTD.

(The gold is extracted in the tanks after the ore has been roasted in the furnace.)

days on the Battery or Kimberley Reef Series overlying the Main Reef horizon. The Horsham Monitor, Lindum, and other companies now incorporated in the Randfontein Deep, were originally floated as outcrop ventures of the Battery Series. The work done showed low-grade, but not unpayable, values, and there is no doubt that this line will be seriously exploited in the future. The Randfontein Deep and the properties in the neighbourhood are thereby afforded an asset far more promising than any possibilities they may possess as deep-levels of the Randfontein reefs. This Battery Reef has been worked in places right along the line as far as the "Witpoortje Break," and on the Lancaster and Lancaster West properties has furnished a large tonnage of payable ore. Thus the Lancaster West works the Battery Reef as an outcrop, and the Main Reef, or Botha Series, as it is called in the locality, as a deep-level. The West Rand Mines —a large amalgamation of the claims between Krugersdorp and the Randfontein Companies—is a property possessing the outcrops of both series. A huge stamp mill has been suggested for this property, and, if the reef conditions prove equal to the estimate formed of them, working on a large scale may reduce costs to some 11s. or 12s. per ton milled.

Between Krugersdorp and Witpoortje, boreholes on the New Rip and the Tudor claims have paved the way for the establishment of deep-level ventures. As a result of these investigations, shaft-sinking was started on the Tudor property, but owing to the financial depression work was suspended before the reef was encountered.

It will thus be recognised that not only has deep-level mining to the west of Witpoortje as yet hardly begun, but next to nothing is known of its possibilities.

The line of fracture or disturbance at the "Witpoortje Break" runs in a north-east and south-west direction. Starting from the Grey's Mynpacht, it is probable that a line drawn in a south-westerly direction marks the northern limit of the highly disturbed area. Evidences of upthrow of reef to the south were shown by the boreholes on the Tudor, marking effects of a series of earth movements which rapidly become more accentuated towards the south. Eastward of the disturbed area, in the Roodepoort district, two deep-levels (the Roodepoort Central Deep and the Durban Roodepoort Deep) have been crushing for some years, and, in spite of labour supply deficiencies, have been worked at a profit. The Vogelstruis Consolidated Deep has struck the reef in its three shafts, and development work from the central and western shafts has given good results. Here, again, also, the Kimberley Reef to the south (generally correlated with the Battery Series of the Western Witwatersrand) has in places been worked, with but indifferent results. The old Marie Louise—now incorporated in the Bantjes Deep—opened up this reef, the ore being treated by a dry crushing plant. The yield obtained, although low, was not so poor as to render its future success altogether hopeless.

On the dip of the Aurora West and the New Unified is the Main Reef West. A shaft on this property has encountered the Main Reef Series, and development is now proceeding. On the two adjoining deep-levels to the east, the Main Reef Deep and Main Reef East, shaft-sinking was also started just prior to the war. These vertical shafts have, however, been suspended, and it is proposed to attack those claims from the incline-shafts of the outcrop property. It is not unlikely that these two deep-levels —offshoots of the Consolidated Main Reef—will eventually be re-absorbed, it being of late a recognised principle to work with as large a claim area as possible, to the end of economising in administration expenses.

NATIVE COMPOUND ON THE ROBINSON GOLD-MINING COMPANY'S PROPERTY.

THE 11th LEVEL SHOOT, ROBINSON MINE.

From this point, proceeding east as far as the Langlaagte Deep, deep-level mining has never been seriously contemplated, not even the preliminary amalgamation of the requisite claim areas having been carried out—the reason being the poor values obtained by the outcrop undertakings. The Langlaagte Deep, although a low-grade mine, is showing values which are rather improving in depth. The notable narrowness of the ore-bodies at Roodepoort is gradually replaced by more normal width, until at the Langlaagte Deep they even exceed the average thickness of these fields.

With the adjoining property, the Crown Deep, the richer central section of the Rand is again entered, although this mine must be considered unexpectedly disappointing in comparison with its outcrop, the Crown Reef.

The Robinson Central Deep is, taken altogether, perhaps the "show" mine of the Rand. It has the highest grade and the lowest working costs of any mine on the fields. Although its returns are not as high as those of the Robinson Mine in its "palmy" days, it is an extremely valuable property.

The Ferreira Deep and Village Main Reef are the next two deep-levels on the line, both earning good profits. Earlier in the career of the Village Main Reef the best ore only was worked, and there was a heavy depreciation in share value when it was realised that so high a grade could not be maintained. Its recent absorption of the Wemmer Gold-mining Company, Ltd., should be a good thing for both companies.

The next property actually ranking as a "deep-level" is the Nourse Deep, now constituting part of the newly-amalgamated Nourse Mines—the intervening areas belonging properly to the "second-row deeps." The Nourse Deep still bears the unenviable distinction of being the most "faulted" mine on the Central Rand, if not on the whole fields. Its grade is good, but underground difficulties have always kept working costs high.

The Jumpers Deep has of late been a great disappointment, working costs comparing very unfavourably with other mines in a similar position.

The Geldenhuis Deep was the first deep-level mine to start crushing, some ten or eleven years ago. At first the results were disappointing, but a rapid and permanent improvement in grade has enabled it for many years to earn a handsome profit.

The Simmer & Jack Proprietary may be regarded as an outcrop and deep-level property combined, but, as a large proportion of its outcrop claims are already exhausted, its future performance will be mainly indicative of its value as a deep-level.

The Rose Deep, the next on the East, is a mine that did remarkably well at the outset, until its workings passed below and south of a large dyke that courses roughly parallel to the reef. Since then the gold-content of the ore has noticeably diminished. As a set-off against this in some parts of the mine very large stopes are worked. Where this is possible the working costs have been very low.

The Glen Deep is another somewhat low-grade proposition, but the mine yields a steady profit.

The Knights Deep is remarkable for the immense amount of water that has been struck. Although the sale of this water to other mines has at times been a source of considerable profit, the feature has been a great obstacle to the commercial success of the mine. The Company has installed a very powerful pumping plant, and its troubles in this respect are now practically over.

Between the Knights Deep and the Witwatersrand Deep there is a narrow strip of ground belonging to the Witwatersrand Gold-mining Company, Ltd., which has not yet been worked, but, in view of its low-lying situation, it is utilised for a dam. It is thought that the water there stored may be the cause of the influx into the Knights Deep. The Witwatersrand Deep, although at first rather a disappointment, is now doing exceedingly well, and is making very good profits.

For some distance beyond the Witwatersrand Deep there cannot be said to be any more first-row deep-levels. The East Rand Proprietary subsidiaries, like the Simmer & Jack, carry their boundaries down to the zone of the second-row deep-levels, where the reef depth is probably in the neighbourhood of 3,000 ft. to 4,000 ft. The East Rand Extension may, however, be considered a first-row deep, owing to the Witwatersrand Series being covered to a considerable depth by the coal-measures. A shaft has struck the reef at a little over 1,400 ft., and development has shown some excellent values. Shaft-sinking is also proceeding further to the south on the areas of the Van Dyk and Rand Collieries. On the Van Dyk the reef should be encountered within a few months of the time of writing. As the depth of the reef at the Rand Collieries approximates more to that of a second-row deep-level, some time must elapse before the ore-bodies are struck. On the Kleinfontein Deep and Van Ryn Deep shaft-sinking was started, and a shaft is also being put down on the north-eastern portion of the Apex ground; but, for reasons easily appreciated, no great hurry is being displayed in exploiting this practically fresh gold-mining area.

Further to the east, work was commenced on the Modderfontein Extension, but was soon abandoned, owing to the lack of funds. On Klipfontein a little desultory work has also been done, with varying results. On Geduld two shafts have struck the reef. Although developments have been disappointing in comparison with the borehole values, in places exceedingly high assays have been obtained. On Cloverfield shaft-sinking still continues, and the reef should shortly be struck. There is an enormous area here on the far East Rand—embracing the farms Brakpan, Schaapenrust, Witpoort, Klipfontein, Holfontein, Springs, Rietfontein, Geduld, Cloverfield, Welgedacht, Grootvlei, Droogefontein, Palmietkuil, Daggafontein, and Vlakfontein—where the Main Reef Series has been proved by boreholes at depths varying between 1,000 ft. and 5,000 ft., as has already been explained. The thinness of the reef throughout this region will make working costs high, but it is possible that the borehole results are unduly discouraging, as portions of the cores were in many instances ground away, and reliable estimates of value rendered impossible. In some parts the reef is at a depth corresponding to that obtaining in the first-row deep-levels, but over the greater proportion of the area the reef lies at a depth of over 2,000 ft. The most promising section, judging from borehole values, lies on Witpoort, Brakpan, and Rietfontein, and here the depth averages over 3,000 ft.

Deep Levels of the Second Row, and "Deeper-Deeps."

Nothing has been done on the areas of deeper reef occurrence anywhere to the west of Johannesburg; the only company, in fact, in a position financially to commence operations at short notice is the New Steyn Estate Company, which will probably put down boreholes before commencing to construct shafts. Lying south of Johannesburg, and on the dip of the richer mines of the rich central section of the Rand, the Robinson Deep was the earliest deep-level mine of the

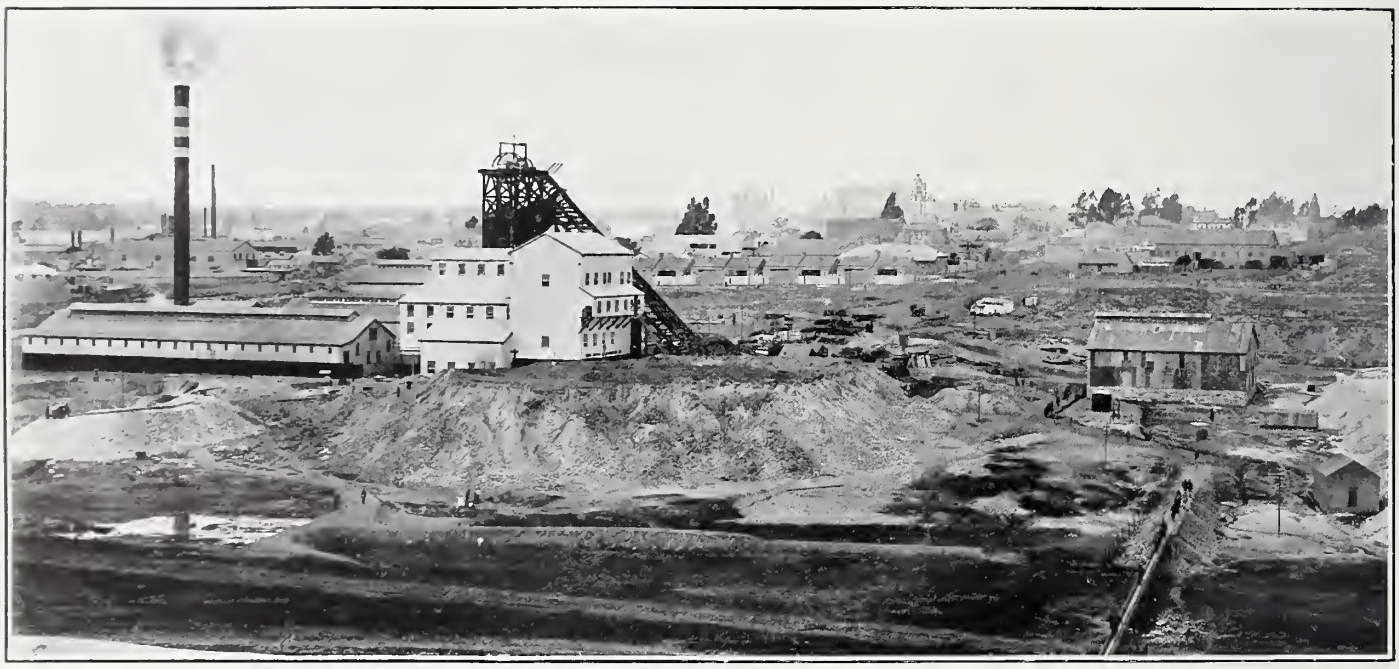
MACHINE DRILL, ROBINSON MINE.

second row to start crushing. It is now making profits of over 20s. per ton—an attainment not equal to the results won by its outcrops. It is working a much greater width of reef. The equipment of 300 stamps will very shortly make this mine the largest individual profit-earner on the fields. Adjoining on the east is the Village Deep, also a producer. This mine's results have not come up to expectations, which possibly were unduly sanguine. The pre-war high profits—subsequently not maintained—made by the Village Main Reef have assuredly deceived many shareholders as to the true value of this property.

To the south of the Village Deep is the area belonging to the Turf Mines, on which shaft-sinking has at last commenced. The claims between the two properties are being absorbed, partly by the Village Deep and partly by the Turf Mines. This course is, at any rate, of considerable advantage to the Turf Mines, as it permits of the shaft being placed nearer to the outcrop, whereby some hundreds of feet of vertical shaft-sinking will be avoided. Next come a group of six deep-level properties—held by the City Deep, the South City, Suburban Deep, the Wolhuter Deep, the South Wolhuter, and the Klip Deep. These companies, floated prior to the war as offshoots of the Klipriversberg Estate, are recognised—in the light of recent events—to comprise too small areas. On this account it is probable they will be amalgamated into two larger concerns. Shaft-sinking has already been commenced, and the reef should be reached approximately in the course of the next two years. The Beznidenville bore-hole was sunk on the ground now belonging to the City Deep, but further than this hole, the core of which gave rather poor assays, nothing has been proved as to the value of the ore-bodies. Beyond these properties there are a number of second-row deeps, all of which have struck their reef and done a certain amount of development, but perhaps not sufficient is yet known to estimate definitely their value. Payable ore has, however, in every instance been encountered. They are the South Nourse, the Jupiter, the Simmer & Jack West, the South Geldenhuis Deep, the South Rose Deep, the Simmer East, and the Knight Central. Of these, the Simmer East only has begun crushing. It appears likely to prove a low-grade mine, but, with a large mill, working costs should also be low. It has made profits, and will doubtless continue to do so. The war, scarcity of labour, and other drawbacks have made the development of the afore-mentioned properties a very expensive undertaking, and the capital expenditure to date has been out of all proportion to the useful work accomplished.

On the dip of the South Geldenhuis and the South Rose Deep are the Rand Victoria Mines and the Rand Victoria East, on which shaft-sinking has just started. South of these properties, again, and extending for a long distance east and west, is the area owned by the Rand Mines Deep. It is impossible to estimate the value of these latter properties, but, from the fact that shaft-sinking has begun on both mines, it would appear that those in control are confident of success. Even on the dip of these properties are held claims, of which the holders have assuredly set themselves a notable task in the exercise of patience, since the time when they will be producing gold can scarcely be said to have risen above the industrial horizon.

Further again to the east are the Driefontein Deep and the Angelo Deep. The Driefontein Deep is sinking only one shaft, eventually to be connected up with the west shaft of the Angelo Deep. Enormous difficulties were encountered in sinking this shaft, owing to the large quantity of water met with. A serious and very unusual accident also occurred, owing to a heavy fall of rock from one of the sides of the shaft, in which 50 natives and one European lost their lives. The water difficulties have now been overcome, and better footage is being made in sinking. At the Angelo Deep both shafts have struck the reef, but development at the time of writing had not shown such good values as obtained by outcrop companies. The Cinderella Deep shaft has also reached the reef. When first struck, very much higher assays



A GLIMPSE OF CENTRAL JOHANNESBURG, FROM THE ROBINSON MINE.

were obtained than the average gold-content of the ore of the two corresponding outcrops, the Cason and the Cinderella. The Hercules, which lies between the Angelo Deep and the Cinderella Deep, is sinking one very big shaft, but at least two years must elapse before the reef can be struck. To the south-east of the Hercules the entire farm Leeuwpoort is held under claim licences. It is a speculative area, altogether of deep-level character, but there is reason to hope that a considerable proportion can be worked at a profit. In this, as well as in other sections of the Rand, ground is held far away on the dip, much of which can hardly contain the reef shallower than some 6,000 ft.

Until a large proportion of the claims having the reef at depth of 4,000 ft. have been proved payable, it is premature to make any movement towards developing still deeper reef areas. It is possible that in the next ten or fifteen years the capitalist will be in a better position to gauge the value of these very deep-level claims. Caution is the only sound policy, as any reckless expenditure of money, or over-capitalisation of claims which may subsequently prove of little value, would do infinite harm to the industry, to the Transvaal, and indirectly to the whole of South Africa.

(II.) OUTPUTS AND PROFITS OF PRODUCING MINES.

In the statistical lists given below, dealing with the production of gold on the Witwatersrand fields, the mines are grouped together according to the different financial firms or "houses" by whom they are controlled. The following table shows the producing mines of each group, with the ounces of fine gold won, estimated total profit, grade per ton milled, and profit per ton milled, for the month of June, 1906:—

	Oz. fine gold.	*Estimated profit.*	*Grade per ton.*	*Profit per ton.*
H. ECKSTEIN & CO.:—		£		s. d.
CENTRAL ADMINISTRATION.				
French Rand	6,410	4,985	30' 0	5 6
Crown Reef	10,553	23,015	40' 6	22 7
Robinson	20,312	52,573	57'16	35 0
Robinson C. Deep	10,914	31,636	55'52	37 10
Ferreira	12,894	29,025	52'84	28 10
Village M. Reef	14,172	20,308	35'10	11 10
Village Deep	7,695	6,259	27'64	5 3
New Modderfontein	4,092	3,059	29' 9	5 3
RAND MINES.				
Durban Roodepoort Deep	3,741	1,150	30'29	2 2
Langlaagte Deep	7,444	6,450	30'74	6 3
Crown Deep	10,786	19,350	33'37	14 1
Ferreira Deep	12,386	31,000	51'36	30 3
Nourse Mines	11,865	15,450	35'87	11 0
Jumpers Deep	6,147	2,750	30'57	3 3
Geldenhuis Deep	9,224	11,600	32'63	9 8
Rose Deep	9,504	12,350	30'70	9 5
Glen Deep	6,830	9,150	32'69	10 3
MARITZBURG CONTROL.—(These companies have their head office in Pietermaritzburg, Natal, and are either independent mines or are run by the Eckstein engineering department.)				
Salisbury G.	1,293	432 (loss)	21'07	1 8 (loss)
Jubilee G.	1,955	2,724	30'23	9 11
City & Suburban	9,587	17,087	32'99	14 1
New Heriot	3,845	3,464	34'65	7 4
CONSOL. GOLDFIELDS.				
Luipaardsvlei Estate	3,840	2,523	28'16	4 1
Robinson Deep	15,586	32,673	45'47	22 5
Simmer & Jack	20,013	32,434	32'69	12 6
Simmer & Jack East	7,900	1,515	26'13	1 2
Knights Deep	8,933	8,085	28'01	6 0
BARNATOS.				
New Unified	2,255	130	24'54	4
Consol. Langlaagte	5,738	4,713	26'91	5 2
New Primrose	7,256	15,547	33'61	18 2
Glencairn	4,095	4,734	23'04	6 3
Witwatersrand G.	9,626	11,510	27'68	7 10
Ginsberg	2,196	1,225	24'60	3 3
New Rietfontein	6,519	10,555	52'74	20 1
NEUMANN.				
Wolhuter	6,261	6,554	28'41	7 0
Wit. Deep	10,938	17,164	33'01	12 2
Treasury G.	2,830	767	27'82	1 9
Consol. M. Reef	6,174	7,175	29'37	8 3
ALBU.				
Roodepoort United	4,483	5,277	37'99	10 6
Meyer & Charlton	5,226	9,656	37'31	16 3
New Goch	7,118	6,566	31'12	6 8
Van Ryn	9,392	16,557	35'25	14 8
GOERZ.				
Lancaster West	2,084	1,358	27'23	4 2
Lancaster G.	4,160	880	23'82	1 2
Princess Estate	3,121	2,459	37'68	7 0
Roodepoort C. Deep	3,117	31,636	35'41	37 10
Geldenhuis Estate	7,103	15,341	34'35	18 0
May Consolidated	5,398	12,087	36'02	17 5
ROBINSON.				
Porges Randfontein	6,027	9,100	36'56	13 0
South Randfontein	5,923	7,000	36'38	10 0
North „	6,000	7,500	35'31	10 5
Robinson „	5,705	5,900	32'10	7 10
Langlaagte Estate	9,221	13,000	26'19	9 2

	Oz. fine gold.	*Estimated profit.*	*Grade per ton.*	*Profit per ton.*
		£		s. d.
FARRARS.				
Driefontein Cons.	6,211	5,255	29·04	5 9
Angelo G.	10,823	19,419	45·74	19 4
New Comet	6,885	6,534	32· 5	7 3
Cason	13,130	19,752	40· 0	14 1
New Kleinfontein	11,176	14,036	30·58	9 0
INDEPENDENT MINES.				
Durban Roodepoort G.	4,528	7,200	34·68	13 6
Vogelstruis Estate	2,320	(not published)	32·15	(not published)
Jumpers	4,967	6,508	33·75	10 5

A second list is here given of the companies of the Rand, the table including both producing and developing companies. The particulars classified show the number of stamps erected and running in June, 1906, the issued capital in each instance, and market price at July, 1906; also the highest and lowest prices the shares have touched since January, 1904. The list is in alphabetical order, and mentions only those companies which are working or are likely to start operations within a reasonable period.

	STAMPS			*At July, 1906.*	*PRICE*		*CAPITAL*	
	Erected.	*Running.*	*Proposed.*		*Highest (since 1905).*	*Lowest (since 1905).*	*Issued.*	*Nominal.*
							£	£
Angelo Deep	—	—	—	$\frac{7}{8}$	$2\frac{3}{8}$	$1\frac{1}{2}$	880,000	1,000,000
Angelo Gold	220	130	220	$3\frac{1}{4}$	$7\frac{5}{16}$	$\frac{5}{8}$	625,000	625,000
Apex Mines	—	—	—	$3\frac{1}{16}$	$2\frac{3}{4}$	$8\frac{5}{8}$	148,931	150,000
Aurora West United	60	—	60	$\frac{3}{16}$	$1\frac{3}{8}$	$\frac{1}{8}$	250,000	250,000
Bantjes Consolidated	—	—	—	$\frac{1}{4}$	$\frac{3}{16}$	$1\frac{1}{8}$	434,350	435,000
Benoni G. Mines	—	—	—	$\frac{3}{8}$	$1\frac{11}{16}$	$\frac{5}{16}$	330,000	350,000
Block A Randfontein	—	—	100	$\frac{5}{8}$	$1\frac{5}{16}$	$\frac{1}{2}$	600,000	600,000
Block B Langlaagte Estate	80	—	—	$\frac{3}{8}$	$1\frac{1}{16}$	$\frac{5}{16}$	550,000	550,000
							82,500 Pref.	82,500
Boksburg Gold Mines	—	—	—	$\frac{7}{16}$	$1\frac{1}{2}$	$\frac{3}{8}$	625,000	650,000
Bonanza	55	55	55	$\frac{11}{16}$	$1\frac{11}{16}$	$\frac{7}{16}$	200,000	200,000
Brakpan Mines	—	—	—	$1\frac{1}{16}$	3	$\frac{7}{8}$	510,000	660,000
Cason G. Mines	220	180	220	$4\frac{1}{8}$	$6\frac{7}{16}$	$3\frac{3}{4}$	500,000	500,000
Ceutral Geduld	—	—	—	$\frac{3}{4}$	$2\frac{1}{2}$	$\frac{1}{4}$	325,000	400,000
Cinderella Deep	—	—	—	$1\frac{15}{16}$	$3\frac{1}{16}$	$1\frac{1}{4}$	500,000	500,000
City & Suburban	160	160	—	$4\frac{3}{16}$	$6\frac{1}{2}$	$3\frac{7}{8}$	1,360,000	1,360,000
Cloverfield Mines	—	—	—	$\frac{5}{8}$	$2\frac{7}{8}$	$\frac{1}{2}$	295,000	385,000
Consolidated Langlaagte	140	140	140	$\frac{5}{16}$	1	$\frac{1}{4}$	890,000	1,000,000
Consolidated Main Reef	120	120	120	$\frac{3}{4}$	$2\frac{1}{16}$	$\frac{5}{8}$	788,654	800,000
Crown Deep	200	200	200	$11\frac{3}{4}$	17	$11\frac{1}{4}$	300,000	300,000
Crown Reef	120	120	200	$10\frac{3}{4}$	16	$10\frac{1}{4}$	120,000	120,000
Driefontein Consolidated	220	160	220	$1\frac{7}{16}$	$5\frac{1}{2}$	$1\frac{1}{8}$	625,000	625,000
Driefontein Deep	—	—	—	$\frac{11}{16}$	$2\frac{9}{16}$	$\frac{1}{2}$	381,000	500,000
Durban Roodepoort Deep	60	60	100	$\frac{7}{8}$	$3\frac{1}{2}$	$\frac{5}{8}$	440,000	450,000
Durban Roodepoort G.	80	80	80	$3\frac{1}{8}$	5	3	125,000	135,000
East Rand Deep	—	—	—	$\frac{5}{16}$	$1\frac{5}{16}$	$\frac{1}{4}$	500,000	600,000
East Rand Extension	—	—	—	$\frac{3}{4}$	3	$\frac{11}{16}$	250,000	300,000
Ferguson Randfontein	—	—	100	—	—	—	412,500	550,000
Ferreira Deep	120	120	200	$4\frac{5}{8}$	$6\frac{1}{2}$	$4\frac{3}{8}$	910,000	910,000
Ferreira G.	120	120	120	$19\frac{1}{4}$	25	$17\frac{1}{2}$	95,000	95,000
French Rand	120	120	120	$\frac{7}{8}$	$3\frac{5}{16}$	$\frac{3}{4}$	510,000	560,000
Geduld Deep	—	—	—	$\frac{3}{8}$	$1\frac{5}{16}$	$\frac{1}{4}$	245,000	275,000
Geduld Proprietary	—	—	—	$2\frac{5}{16}$	$7\frac{3}{4}$	$1\frac{15}{16}$	400,000	400,000
Geldenhuis Deep	200	200	200	6	$11\frac{1}{2}$	$5\frac{3}{4}$	300,000	350,000
Geldenhuis Estate	120	120	120	$3\frac{15}{16}$	$5\frac{13}{16}$	$3\frac{5}{8}$	200,000	200,000
Geldenhuis M. R.	30		(Exhausted)	—	—	—	150,000	150,000
Ginsberg G.	60	60	(Balmoral)	$\frac{7}{8}$	$2\frac{7}{8}$	$\frac{3}{4}$	175,000	175,000
Glen Deep	100	100	—	$2\frac{5}{16}$	$5\frac{5}{16}$	$2\frac{1}{8}$	600,000	600,000
Glencairn M. Reef	160	110	160	$\frac{9}{16}$	$1\frac{5}{8}$	$\frac{1}{2}$	550,000	550,000
Hercules Co.	—	—	—	—	—	—	143,336	145,000
Johnstone Randfontein	100	—	—	—	—	—	412,500	550,000
Jubilee G.	50	50	50	2	$4\frac{1}{8}$	$1\frac{7}{8}$	50,000	50,000
Jumpers Deep	100	100	100	$1\frac{1}{2}$	$4\frac{3}{4}$	$1\frac{3}{8}$	523,895	530,000
Jumpers G.	100	100	100	2	$4\frac{1}{8}$	$1\frac{7}{8}$	100,000	100,000
Jupiter	—	—	—	$1\frac{1}{8}$	4	$1\frac{1}{16}$	575,000	600,000
Kleinfontein Deep	—	—	—	—	—	—	529,587	681,086
Klip Deep	—	—	—	—	—	—	375,000	500,000
Knight Central	—	—	—	$1\frac{1}{16}$	$2\frac{3}{4}$	$\frac{13}{16}$	525,000	525,000
Knights Deep	150	150	150	$1\frac{7}{8}$	$3\frac{7}{16}$	$1\frac{3}{8}$	480,193	550,000
Lancaster G.	100	100	100	$\frac{3}{8}$	$2\frac{7}{16}$	$\frac{1}{4}$	400,000	400,000
Lancaster West	40	40	—	$\frac{9}{16}$	$2\frac{5}{8}$	$\frac{3}{2}$	195,000	300,000
Langlaagte Block R Deep L.	—	—	—	—	—	—	75,000	75,000
Langlaagte Deep	200	120	200	$1\frac{7}{8}$	$3\frac{3}{8}$	$1\frac{1}{4}$	800,000	800,000
Langlaagte Estate	200	190	200	$2\frac{3}{8}$	$4\frac{1}{16}$	$2\frac{1}{4}$	470,000	470,000
Langlaagte Royal	—	—	—	—	—	—	180,000	180,000
Le Champ d'Or	50	50	50	$\frac{1}{4}$	$\frac{15}{16}$	$\frac{3}{16}$	134,591	135,000
Luipaardsvlei Estate	60	60	60	$\frac{11}{16}$	$2\frac{1}{8}$	$\frac{5}{8}$	398,400	400,000
Main Reef Deep	—	—	—	about $\frac{1}{2}$	—	—	345,000	450,000
Main Reef East	—	—	—	about $\frac{1}{2}$	—	—	343,000	450,000
Main Reef West	—	—	—	about $\frac{1}{2}$	—	—	450,000	450,000
May Consolidated	100	100	100	$2\frac{5}{8}$	$4\frac{5}{16}$	$2\frac{1}{2}$	288,750	290,000
Meyer & Charlton	80	70	80	$4\frac{1}{2}$	$5\frac{5}{8}$	$3\frac{3}{4}$	100,000	100,000
Modderfontein Deep Level	—	—	—	$1\frac{3}{8}$	$4\frac{3}{8}$	$1\frac{1}{4}$	90,000	100,000
Modderfontein Extension	—	—	—	$\frac{5}{8}$	$2\frac{7}{8}$	$\frac{9}{16}$	325,000	325,000
Mynpacht Randfontein	—	—	—	—	—	—	632,500	750,000
New Comet	160	130	160	$1\frac{3}{4}$	$3\frac{5}{16}$	$1\frac{5}{8}$	500,000	500,000
New Goch	120	120	120	$1\frac{1}{8}$	$3\frac{3}{4}$	$\frac{7}{8}$	300,000	300,000
New Heriot	70	70	70	$3\frac{1}{8}$	$4\frac{1}{8}$	$1\frac{7}{8}$	114,864	115,000
New Kleinfontein	200	200	200	$1\frac{1}{2}$	$2\frac{3}{4}$	$1\frac{3}{8}$	900,000	900,000
New Modderfontein	100	70	100	$4\frac{3}{4}$	$11\frac{1}{8}$	$4\frac{5}{16}$ £4	290,000	300,000
New Primrose	120	120	160	$2\frac{5}{8}$	$3\frac{15}{16}$	$2\frac{3}{8}$	325,000	325,000
New Rietfontein Estate	—	—	—	$1\frac{13}{16}$	3	$1\frac{1}{2}$	270,000	270,000
New Rip	—	—	—	—	—	—	256,833	400,000

	STAMPS			At July, 1906.	PRICE		CAPITAL	
	Erected.	Running.	Proposed.		Highest (since 1905).	Lowest	Issued.	Nominal.
							£	£
New Spes Bona	40	—	—	—	—	—	150,140	250,000
New Steyn Estate	—	—	—	—	—	—	300,000	300,000
New Unified	60	60	60	¾	1¼	⅜	250,000	270,000
North Geduld	—	—	—	⅜	2 9/16	¼	325,000	400,000
North Randfontein	100	100	100	1 3/16	2 1/8	1 1/16	450,000	450,000
Nourse Mines	180	180	180	2½	5⅛	2 1/8	675,000	675,000
Paarl Central	60	—	60	1⅛	13/16	⅜	550 000	550,000
Porges Randfontein	100	100	100	1 9/16	1⅝	1⅜	500,000	500,000
Princess Estate	50	50	50	1/16	1 13/16	¼	165,000	200,000
Rand Collieries	—	—	—	—	—	—	400,000	500,000
Rand Klipfontein	—	—	—	2¼	7⅜	2	63,640	65,000
Rand Nucleus	—	—	—	—	—	—	260,000	260,000
Rand Victoria East	—	—	—	1/16	1⅜	⅜	379,322	500,000
Rand Victoria Mines	—	—	—	⅛	3⅛	¾	630,000	750,000
Randfontein Deep	—	—	—	—	—	—	740,340	850,000
Robinson Central Deep	100	100	100	5 5/16	5½	4½	440,000	500,000
Robinson Deep	300	200	300	4⅛	6⅝	4 5/16	980,000	980,000
Robinson G.	210	210	210	8	10⅜	7½ £5	550,000	550,000
Robinson Randfontein	100	100	100	1	2	15/16	600,000	600,000
Roodepoort Central Deep	50	50	—	⅝	2¼	½	309,390	320,000
Roodepoort G. M. Co.	—	—	—	—	—	—	325,000	500,000
Roodepoort United M. R.	110	—	70	1⅜	4	1½	295,000	310,000
Rose Deep	200	200	200	3⅜	9⅛	3	425,000	425,000
Salisbury G.	50	50	—	1/16	1⅛	⅞	100,000	100,000
Simmer & Jack East	200	170	200	1⅛	2 13/16	1	650,000	900,000
Simmer & Jack Proprietary	320	—	320	1⅜	2⅛	1⅛	3,000,000	3,000,000
Simmer & Jack West	—	—	—	1¼	4⅛	1	360,000	400,000
South City	—	—	—	—	1½	⅜	450,278	540,000
S. Geldenhuis Deep	—	—	—	1⅛	3 3/16	1	367,000	400,000
S. Knights	—	—	—	½	1 7/16	7/16	500,000	650,000
South Nourse	—	—	—	—	—	—	523,908	582,120
S. Randfontein G.	100	—	100	1⅜	2 5/16	1½	450,000	450,000
South Rose Deep	—	—	—	3/8	2⅜	¼	514,300	600,000
South Wolhuter	—	—	—	½	¼	3/16	450,000	600,000
Stubbs Randfontein	—	—	—	—	—	—	412,500	550,000
Suburban Deep	—	—	—	—	—	—	—	—
Treasury G.	60	60	60	1 1/16	4½	¾ £4	540,000	540,000
Tudor G.	—	—	—	⅜	2	¼	340,000	400,000
Turf Mines	—	—	—	7/16	1⅞	7/16	1,787,000	1,787,000
Van Hulsteyn Randfontein	—	—	—	—	—	—	412,500	550,000
Van Ryn Deep	—	—	—	—	—	—	592,499	785,000
Van Ryn G.	160	160	160	3	4⅜	2 3/16	500,000	500,000
Village Deep	180	150	180	2⅜	6⅜	2⅛	522,972	522,972
Village M. Reef	220	220	220	3 1/16	7¼	3 1/16	472,000	472,000
Violet Consolidated	—	—	—	1⅜	3 5/16	1⅛	396,762	500,000
Vogelstruis Cons. Deep	—	—	—	7/16	1⅞	3/16	393,000	500,000
Vogelstruis Estate	60	50	60	⅝	1½	½	216,231	250,000
W. Randfontein Central	20	20	20	—	—	—	100,000	100,000
West Rand Mines	—	—	—	13/16	2 7/16	½	500,000	500,000
West Randfontein	—	—	—	—	—	—	412,500	550,000
West Roodepoort Deep	—	—	—	—	—	—	310,800	345,000
Windsor G. M.	50	50	—	⅛	1	1/16	376,858	450,000
Witwatersrand Deep	200	200	200	3 1/16	4⅜	2⅜	500,000	550,000
Witwatersrand G.	220	220	220	2 11/16	6 15/16	2 9/16	375,000	375,000
Wolhuter Deep	—	—	—	—	—	—	392,500	520,000
Wolhuter G.	120	120	120	2⅞	3¾	2⅜ £4	860,000	860,000
York G. M. Co., Ltd.	40	—	40	—	—	—	66,284	66,284

(III.) PROSPECTING.

In the earlier history of the fields, when outcrops only were worked, prospecting was carried on mainly by means of surface trenching, and within a very few months of the discovery of the Rand the course of the outcrop of the Main Reef Series was known almost as well as it is known to-day. When attention began to be paid to the possibilities of the "deep-levels," however, other methods of prospecting had to be adopted, and diamond-drilling was resorted to. These diamond drills bore an annular hole through the rock, leaving a solid core (in the centre of the drilling rods), which is drawn to surface at intervals, thus affording a section of the rocks through which the drill cuts. The cutting face or crown of the drill consists of a steel ring, round which are inserted the diamonds, or "carbons," as they are called. The ring is screwed on to the working end of a series of rods which are rotated by an engine at surface, and additional rods are screwed on at the top as the depth of the hole increases. A revolving motion is given to the rods, and their weight produces sufficient downward pressure to make the diamonds grind away the rock in a ring at the bottom of the hole. The carbons—a form of black diamond—are harder and tougher than the transparent stones. They are exceedingly expensive, £14 and £15 a carat being paid for 3-carat or 4-carat stones. In appearance they seem to the untechnical eye to be merely black stones, instead of being more valuable than the ordinary diamond. They are principally found in Brazil. The supply of "carbons" is not very plentiful, as can be well understood from their high price. The size of the core obtained varies from about 2 in. to about ⅜ in. in diameter, according to the nature of the work being done, and the consequent size of the drill rods. Where the rock is likely to be of a friable nature, drills giving large cores are used, and very deep holes are usually started with large "crowns" which are replaced by smaller ones in succession as depth is attained.

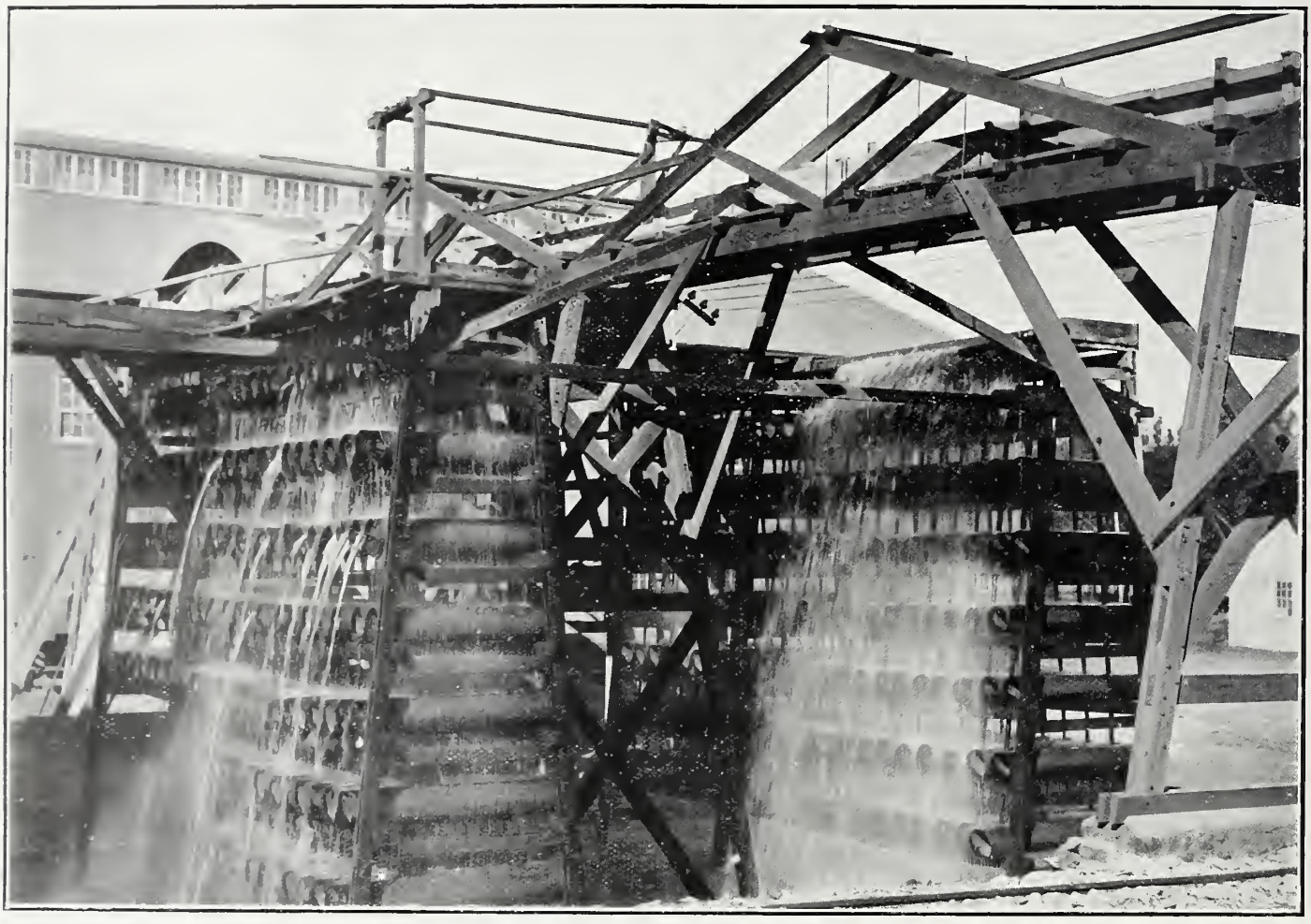
The first borehole of importance was the Bezuidenville hole put down in 1895, on the claims now belonging to the City Deep, Ltd. The Main Reef Series was encountered at a vertical depth of 3,251 ft., and the discovery did a great deal to establish confidence in the future of deep-level mining on the Rand. This was the first proof of the existence of the conglomerate beds at a depth of over 1,000 ft., and was the beginning of a period of great activity in borehole prospecting, which continued up to the present curtailment of prospecting consequent upon the complete lack of finality in mining conditions, brought about by political interference with the economic foundations of the industry. Not only were boreholes put down on the dip of proved outcrop mining, but an enormous amount of drilling was done in the regions suspected to contain the eastern and western extensions of the Witwatersrand Beds, where the Main Reef horizon is covered by more recent geological formations.

By means of the boreholes a huge area of gold-bearing ground has been

proved in the Springs-Nigel district. The Main Reef has been found to occur as an almost horizontal but slightly undulating sheet, and usually at a reasonable depth over an area of more than 100 square miles. Assay results have generally shown good values attended by very narrow reef widths, but in the majority of cases the result would not prove payable over a stoping width, under existing industrial conditions. As, however, in very many cases the more friable and probably richer portions of the reef core have been ground away, it is probable that on the whole the real stoping value is higher than indicated by the boreholes. In any case there exists here a field of enormous speculative possibility, which, if not immediately, at any rate within the next 50 years, is likely to become the centre of an immense industry. Further east, towards Bethal, some drilling has been done in the likelihood that there may be another syncline or basin carrying the Main Reef underneath the overlying Karroo Beds (coal-measures), but the ventures have been in the majority of cases inadequately financed, and have as yet proved nothing for or against the theory.

At the other end of the Rand, to the south-west of Randfontein, the Western Rand Estates have "struck" payable reefs in some of their boreholes, and there will probably be large mines in this neighbourhood in the future. Boreholes on the Central Rand have proved the existence of the Witwatersrand Beds at depths as great as it is possible for boreholes to go—in fact deeper than in many cases it will be found profitable, with present appliances and resources to work the reefs.

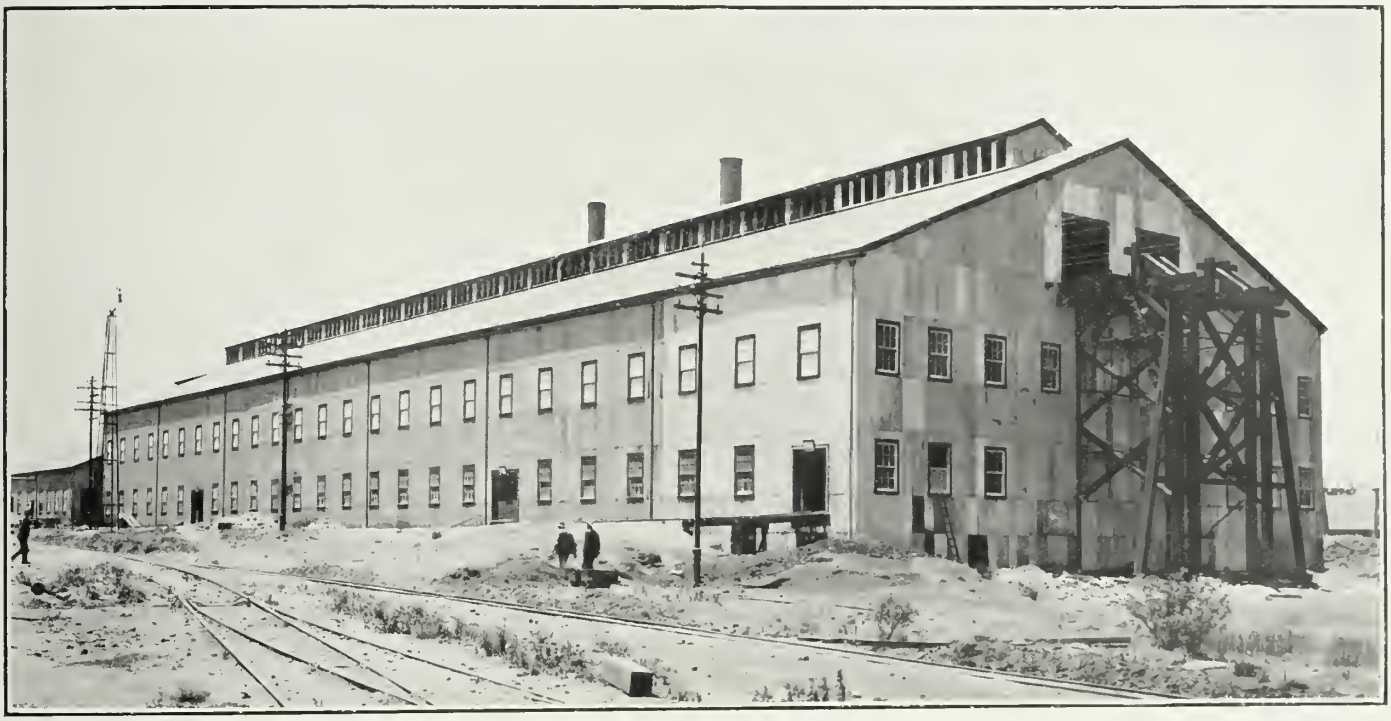
Although borehole prospecting has been invaluable in proving the existence of banket beds of the Rand Series in depth, or where not exposed at surface, still in many respects the results obtained are not entirely satisfactory, there being several material drawbacks to this method. Firstly: The grinding away of portions of the core is inevitable, particularly where the strata are friable, and it frequently happens that the most important sections are thus nearly all lost. Secondly: The very small section of the reef obtained leads to unreliability in the assay results, as forming a commercially useful guide as to the average reef values in the area in question. Thirdly: The deflection in the course taken by the rods can never be foreseen, either as to inclination or direction. It is very seldom that a borehole, although started in a vertical direction, will continue straight for any depth, and holes sunk to a depth of 4,000 ft. and over have been found to have deflected as much as 60° from the vertical, the bottom being in some instances more than 2,000 ft. horizontally distant from the top of the hole. The deflection in the holes can fortunately be measured by instruments made for the purpose. There are several different types of these used. The simplest and perhaps most satisfactory apparatus consists of a brass cylinder which



WATER-COOLER, ROBINSON DEEP.

(The cold water condenses the steam, and cools the air in the compressors.)

slides down the hole, and contains a small compass and plumb-bob. At a pre-arranged time, by means of a watch and a dry electric cell, which lights two small lamps, the positions of the compass and the plumb-bob are photographed inside the hole. This operation is repeated at different depths, and a chart made from the data obtained shows the true course taken by the rods. By means of surveying instruments, it was found that the two boreholes sunk on the Turf Mines properties actually struck the reef outside their own claims, and well into the ground of the Booysen's Estate. So much, indeed, may the deflection become in deep holes, that it is not worth while, in many cases, guarantee to do it at a given price—ranging from 20s. to 50s. per foot, according to the depth and general conditions. This is rather a speculative business, as occasionally very hard rocks are encountered, which wear away the carbons very rapidly. If an accident is met with, a hole may become useless, and may have to be commenced again after some hundreds of feet have been drilled, while a crown containing some carats of valuable carbons may be left in the bottom of the hole. Diamond-drill prospecting is carried on underground by some of the working mines, for the purpose of searching for reefs lost by "faulting," and of testing the value of underlying or overlying reef. The machines in Rand, but the Kimberley Series is the only one on which payable results have been obtained on a commercially workable scale. The Du Preez or Rietfontein Reef has been very largely prospected for, and holders of sections to the north of the Main Reef are continually claiming to have struck this series. As a matter of fact the geological features distinguishing the Du Preez occurrence at Rietfontein are only now being properly recognised, and the more carefully the problems they present are studied the more improbable does it appear that a fresh occurrence will be found anywhere immediately north of the Main Reef. Were prospectors and claim-holders to study more intelligently the conclu-



BATTERY-HOUSE OF THE SIMMER & JACK GOLD-MINING COMPANY.

(The Simmer & Jack is the biggest mine on the Rand, its battery has the largest number of stamps, and the Company has the most extensive area of ground.)

continuing them after a certain depth, as they take a more horizontal than a vertical direction. An interesting fact in connection with this deflection in boreholes is that the hole almost invariably turns against the dip of the strata—that is to say, if a hole be put down where the strata are dipping southwards, the course of the borehole is likely to deviate towards the north—in precisely the opposite direction to that to which it would be inferred the hole would tend. No satisfactory explanation has yet been found to account for this.

The drilling work on the Rand is usually let out to contractors who this instance are small, and are actuated by compressed air or electricity.

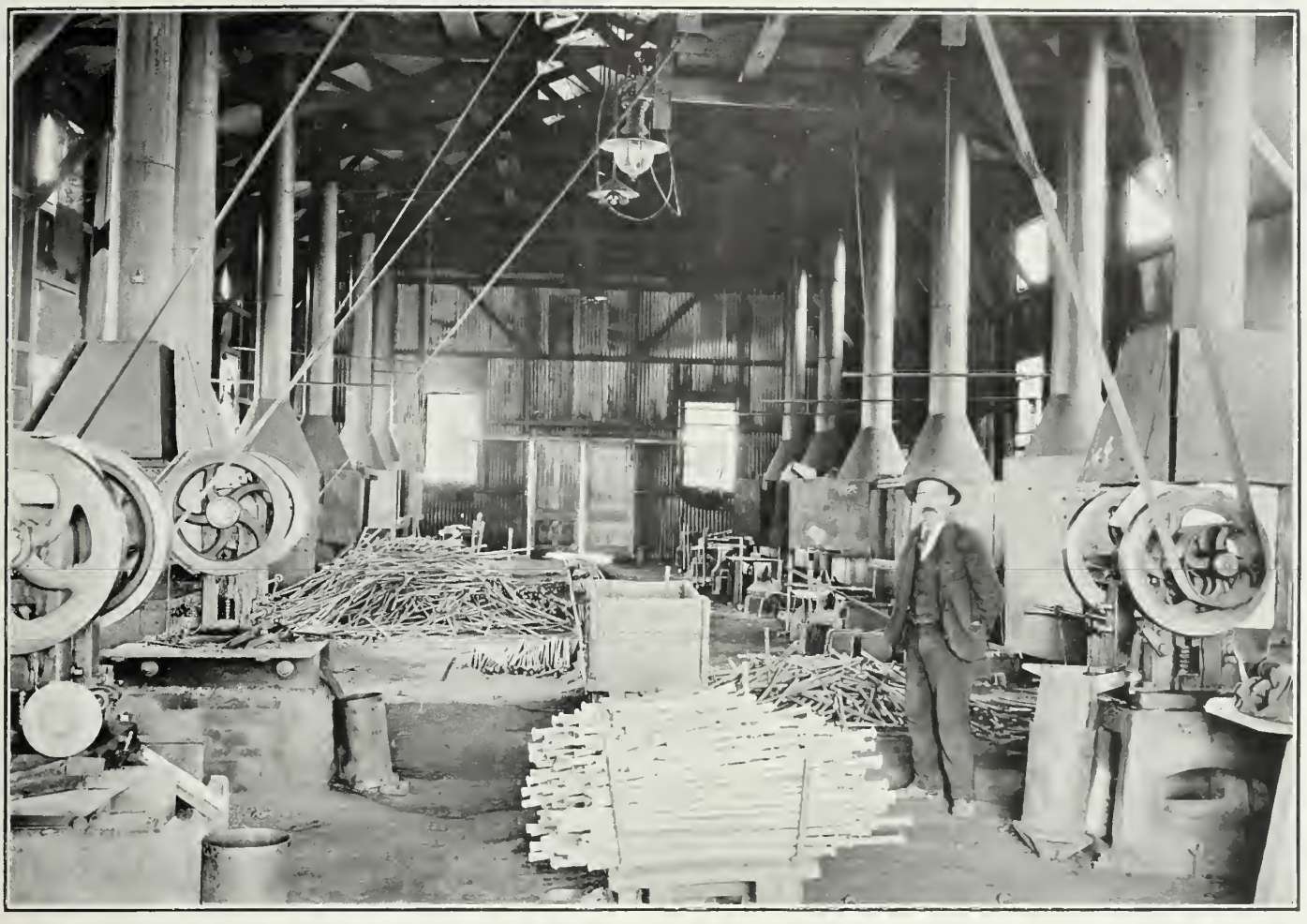
A small amount of surface prospecting is also carried on from time to time on the northern series of reefs between Roodepoort and Krugersdorp, usually with disappointing results. Great hopes have been held out of profitable mines being discovered in this region, but the reefs are small, the gold-contents are exceedingly variable, and the formation is in places much broken. On the overlying reef of the Kimberley, Bird, Livingstone, and Elsburg Series, a great deal of prospecting work has been done since the discovery of the sions steadily being come to by geologists, much useless expense would be avoided.

(IV.) THE "LIFE" OF THE FIELDS.

"Life," in mining parlance, is taken to mean the period during which, under reasonably favourable conditions, a proposition can be made to yield an adequate commercial profit. As concerns the Witwatersrand Goldfields this period has frequently been estimated, and the wide difference between the results obtained prove how difficult the establishment of a true forecast

must be. Estimates of the probable total gold value to be won from the Rand have varied from £700,000,000 to £2,871,000,000, and it is likely that these figures represent the limits within which will fall the actual yield of bullion from the Main Reef and Kimberley Reef Series, in the region lying between the most distant mine of the Randfontein group on the west and the Modderfontein Extension ground on the east. The chief difficulty in arriving at any satisfactory conclusion lies in the entire absence of finality in the matter of working costs, which alone afford a sound basis for calculating the commercial value of the ore available. Working costs on the Rand ore-bodies at present average about 22s. 6d. per ton milled, but could these costs be reduced to 15s. (as many competent judges have considered probable, or at any rate possible), so large a quantity of ore unpayable under existing conditions would be brought within the range of profitable mining that the available tonnage would be more than doubled. On the Main Reef Series alone many properties now neglected as unprofitable would pay handsomely, and some of the lower-grade banket-beds of series outside of the Main Reef horizon could also be worked to pay. Thus it is obvious that, even if the gold-contents of the workable ore on the Witwatersrand fields could be estimated with any reasonable approach to accuracy, there still remains an incalculable factor in the working costs of ten, or twenty, or perhaps fifty years hence. Since the present yearly gold production is working steadily up to £25,000,000, the smaller of the two estimates above given places the life of the Rand at nearly 30 years, and the larger estimate at well over 100 years. Subsequent to these estimates being published further reef discoveries have been made in the Eastern and Western Extensions of the Main Reef, whilst in the central section itself payable deposits have been found in the footwall of the Main Reef that hitherto had escaped detection, and that have led to the re-opening of miles of abandoned stopes. Nevertheless, although experience proves that in the end the optimist is always more justified in his forecasts than the pessimist, it must be clearly recognised that on the available information the true value of the far eastern and the far western areas as gold-producers cannot be even approximately gauged. It is, however, probably obvious to the most confirmed optimist that a century, or at any rate a century and a half, hence the present known area of the Witwatersrand Goldfields will be exhausted; but, in any case, at even a reasonably conservative estimate, the date of exhaustion is far enough ahead to make it scarcely worth worrying seriously about. To return to the available tonnage. It depends on many factors, among them to a very great degree as to what depth mining is likely to be carried with profit. The tendency at the moment is assuredly not to estimate so optimistically as was the fashion three or four years ago. At that period, mining at a vertical depth of as much as 12,000 ft. was talked of, but to-day 6,000 ft. is the outside limit of depth at which it is thought probable the reef can be made to pay. The mere mechanical obstacles in the way of passing down to, and up from, great depths daily at each change of

MILL INTERIOR, SIMMER & JACK.
(One of the largest batteries in the world.)



THE DRILL-SHARPENING SHOP, SIMMER & JACK.

"shift" an army of underground workers, and of ensuring their health and safety under all probable contingencies; the task of supplying with tools, explosives, stores, and materials of all kinds, a busy hive of industry deep in the bowels of the earth, along some forty miles of reef; the vital need of draining these huge holes of water, and of supplying them with air; the difficulty of hauling the vast tonnage of ore required to feed even three times the number of stamps that are actually at work during this cramped period of the industry's history—all these problems are factors curtailing the life of the fields, since there is a limit—and, after all, no distant one—below which their solution becomes physically impossible. At the present time the deepest milling mine has not reached further than about 3,000 ft. below the surface, but there are two or three developing mines working at depths of over 4,000 ft. No shafts have been projected to strike the reef at a greater depth than this, and much more reliable data as to the value of the reef at such an extreme depth must be available before capitalists will dare to risk the huge sums necessary to sink these very deep shafts. It must be borne in mind that our knowledge of deep-level values is confined almost entirely to the Central and near East Rand, the only data available from the other districts being from borehole results. The whole question of deep-level mining rests firstly, secondly, and at all times on values. If the gold-contents warrant it, the reefs will be worked to very great depths, but when the grade of values falls until it is equal to the grade of costs, at that point the reef will of course cease to be worked. It is apparent that costs will gradually increase as depth is attained, and it appears probable from the data available that values decrease; at what average depth these two factors will balance each other it is for the future to decide. For the present the rate of gold production on the Rand is on the increase, and it appears probable that it will be some few years before the maximum yearly output is reached. For the future of Johannesburg, and of the Transvaal in general, it is to be hoped that before that time arrives other industries will have established a footing in the country, and that its prosperity will not depend so entirely upon its gold industry as it does to-day. The true friends of South Africa keep before their eyes the certainty of the eventual exhaustion of these wonderful goldfields, and anticipate the time when the empty ruins of the Rand will be the solid foundations of a more normal industry and a more widely-diffused prosperity throughout the whole sub-continent.

(V.) EQUIPMENT OUTLAY.

The cost of equipment on the mines of the Rand runs into very large figures, and with deep-levels this is a much more important item than with outcrop mines. A great deal of money has been wasted in unsuitable and badly-arranged machinery, more especially in the earlier history of the fields; and of late years there have

undoubtedly been instances of inexcusable extravagance. The following table* sets forth instructively an estimate of the expenditure incurred in equipping some of the larger mines on the fields :—

Company.	No. of Stamps.	Development.	Equipment.	Total.
		£	£	£
Angelo	220	215,799	489,082	701,881
Driefontein Consolidated	220	199,179	497,007	696,186
Crown Deep	200	387,765	465,392	853,157
Geldenhuis Deep	200	171,035	413,931	584,966
Langlaagte Estate	200	78,649	336,038	414,687
New Kleinfontein	200	215,625	522,854	738,479
Robinson	210	43,000	361,634	404,634
Robinson Deep	200	327,666	749,476	1,077,142
Rose Deep	200	316,342	435,191	751,533
Simmer & Jack	320	339,048	1,035,663	1,374,711
Witwatersrand G.	220	225,650	411,718	637,368
Witwatersrand Deep	200	365,354	474,958	840,312

*"South African Mines, Commerce, and Industry."

A noteworthy feature of this list is the tendency of late years to increase rather than to decrease the capital expenditure. The three earliest equipped mines — the Geldenhuis Deep, Langlaagte Estate, and Robinson — appear to have spent less in proportion to their number of stamps than many of the later ventures. It must be borne in mind, however, that the two latter are outcrop propositions. The increased winning of ore by means of rock drills, with the consequent outlay in air-compressing machinery, and the more extended use of mechanical appliances, has had much to do with the larger expenditure of recent years, for the steadily growing shortage of manual labour has driven the mines to the wholesale use of mechanism. A most important factor towards the increased expenditure in deep-level mining is the sinking and equipping of shafts. The cost of a shaft striking the reef at a vertical depth of 1,000 ft. or so is not so very great, unless water is encountered. As a rough approximation a 5-compartment shaft to this depth will cost £25 per foot for striking and £60,000 to equip, including headgear, winding engines, and boilers. With the deeper levels, however, where the reef is struck at about 4,000 ft., the capital expenditure is much greater. In the first place, the lower 2,000 ft., even under favourable conditions, cost more than the upper half of the work, owing to the greater time taken in hauling broken rock and water, lowering timber, etc., while if the water encountered is more than can be handled by the winding engine (using the cage for baling purposes), a pumping plant to hoist from this depth must be installed. This must be done in at least five or six stages, and electricity would probably be used to work the pumps. If a pumping plant is necessary, its cost, together with the requisite power plant at surface, cannot be reckoned at less than £30,000. The winding engines necessary to hoist from great depths are also very costly, and the expense does not end here, as separate engines must be placed underground for hoisting in the inclined portion of the shaft, where it is sunk on the plane of the reef. It is probable, therefore, that the average cost of sinking and equipping a 4,000 ft. shaft will prove to be something like £250,000. A big "deep-deep"-level property, then, with two shafts sunk to the reef and adequately equipped, will need an expenditure of probably £500,000 before it can bring to the surface a ton of reef, or arrive at a workable estimate of the ore value, beyond what can be learned from a borehole core.

GENERAL VIEW, JUMPERS DEEP.

With regard to deep-level shaft-sinking, the subject is of sufficient importance to warrant special consideration. Owing to the notable costliness of these very deep shafts the present policy is to place them as far apart as possible, so that each shaft may serve a great number of claims over the prospective profits of which the great expense may be more widely distributed. Perhaps the largest shafts now being sunk on the Rand are those on the Hercules and the Driefontein Deep properties, both of which have seven compartments, and are some 38 ft. long inside timbers. At the Driefontein Deep exceedingly slow progress is being made owing to water difficulties, but at the Hercules better speed is being attained, the latest monthly footage being in the neighbourhood of 130 ft. The cost and rate of sinking some of the deep-level shafts before the war is given in Truscott's book on "Witwatersrand Gold-mining Practice," as follows:—

Mine.	*Name or No. of Shaft.*	*Total Depth.* Feet.	*Size of Shaft Excavation.* Feet.	*Rate of Sinking, Feet per Month.*	*Cost per Foot of Shaft Sunk.* £ s. d.	
Rose Deep	1	911	23 by 8	—	31 1 4	
Rose Deep	2	714	18 by 8	—	26 16 5	
Nourse Deep	1	991½	Small	—	15 10 7	
Nourse Deep	2	1580	3 compartments	—	20 1 3	
Nourse Deep	3	1483	3 compartments	—	20 11 2	
Jumpers Deep	1	1057	23 by 8	65	24 9 0	
Jumpers Deep	2	1352	23 by 8	65	24 9 0	
Glen Deep	1	1005	18½ by 8	91	22 4 2	
Glen Deep	2	1017	18½ by 8	66	24 2 10	(Sunk indyke from 42 ft. to bottom.)
Langlaagte Deep.. ..	1	1174	23 by 8	60	26 3 5	
Langlaagte Deep.. ..	2	968	23 by 8	60	22 17 7	
Durban Roodepoort Deep	2	1444	18 by 8	87	19 10 5	
Robinson Deep	1	2389	22 by 8	69	25 14 7	(Sunk entirely by hand-drilling. The costs include an amount for depreciation of plant and machinery used in sinking.)
Robinson Deep	2	1923	18½ by 8	69	24 3 7	
Crown Deep..	1	1324	22 by 8	—	33 14 8	
Crown Deep..	2	1100	22 by 8	—	33 14 8	
Vogelstruis Deep.. ..	East	891	18 by 7½	65	20 14 0	(Hard dyke from 250 ft. to bottom.)
Vogelstruis Deep.. ..	Central	1055	18 by 7½	89	18 12 4	
Vogelstruis Deep.. ..	West	960	18 by 7½	86	15 5 9	(Sunk entirely by hand labour.)
West Roodepoort Deep ..	1	734	18 by 7	67	19 6 0	
West Roodepoort Deep ..	2	926	18 by 7	67	19 6 0	
Knights Deep	Robertson	885	28 by 8	55	34 4 3	(Sinking interfered with by water.)
Knights Deep	Connor	716	28 by 8	40	41 7 11	
Simmer East	Clement	1546	28 by 8	94	22 7 11	(Sunk entirely by hand labour.)
Simmer East	Hammond	1518	28 by 8	96	23 3 3	(Sunk entirely by hand labour.)
Simmer East	Lohse	691	28 by 8	70	28 12 2	(Sunk entirely by hand labour.)

From the above figures it is clearly impossible to estimate what will be the cost and time of sinking any particular shaft, since so much depends on the class of ground, and the amount of water encountered. The great expense of the Knights Deep shafts was almost entirely owing to the enormous volume of water met with.

Timbering practice does not vary much on the Rand: the ground being usually very good, the setts are used more for guiding the skips or cages in the shaft than for supporting the rock. The wall plates and end plates are usually about 9 in. by 9 in., studdles 8 in. by 8 in., and dividers 9 in. by 4 in., if pitch pine is used, while if the harder Australian karri wood is adopted smaller sections will answer the purpose. Of late there has been an increasing tendency to use steel setts, which last longer, and are safer in case of fire. They have not yet undergone any lengthy period of trial to show if they are entirely satisfactory. It is proposed, however, to use them in the shafts to be sunk on the Klipfontein Estate.

In sinking deep-level shafts, it is obvious that the time factor is of immense importance. A shaft of 4,000 ft. may be sunk with luck in about four years. The present value of £1 four years hence at 6 per cent. is rather under 16s.; while if, owing to bad luck and unforeseen delay, the reef is not struck until six years after operations are started, the present value is reduced to 14s. In other words, the value of deep-level claims is materially lessened owing to the long period that must elapse before profits can be earned from them, and the longer the delay the more seriously are they cheapened. It must be borne in mind also that 6 per cent. is a very low rate of interest to assume for such a speculative venture as deep-level mining; so, if a higher rate of interest obtains, the present value works out at less. If 10 per cent. be taken, the present value of £1 at the end of six years stands at a little over 11s. For this reason every effort is made in shaft-sinking to expedite matters, and an extra outlay of £1 or £2 a foot is well spent if it results in an appreciably increased rate of progress. Sinking is either carried out by contract, or a bonus of so much per foot is allowed for every foot sunk over and above a given figure per month.

One argument often used against the likelihood of deep-level mining being profitable is the question of increased temperature at depth. It appears so far, however, from experiments already conducted, that there will be no obstacle encountered from this source within the depth of practicable mining. The increase in temperature according to certain experiments made at the Robinson Deep was only 1° Fahr. for every 220 ft. in depth. Experiments conducted at other mines have given somewhat different results, but in no case has the rise been rapid. Artificial ventilation will need to be resorted to in the deeper levels, and much more could be done in existing mines to improve the atmosphere underground. The Government mining regulations are exceedingly strict on the point of not allowing a mine to start crushing until it has two shafts connected—this provision being insisted upon for the sake of the health and safety of the miners; since, if anything went wrong in so deep a shaft, in the lack of another exit all those underground at the time would inevitably lose their lives. The compressed air used for rock-drilling and for other purposes underground helps to ventilate a mine to a small extent, and tends also to cool the atmosphere. Without this aid, artificial ventilation would long since have had to be resorted to, particularly in the case of deep-levels starting development, before connection has been made between the shafts. Too little attention is unquestionably paid to the matter of ventilation in the mines of the Witwatersrand, and the health and efficiency of those working underground without doubt suffer needlessly.

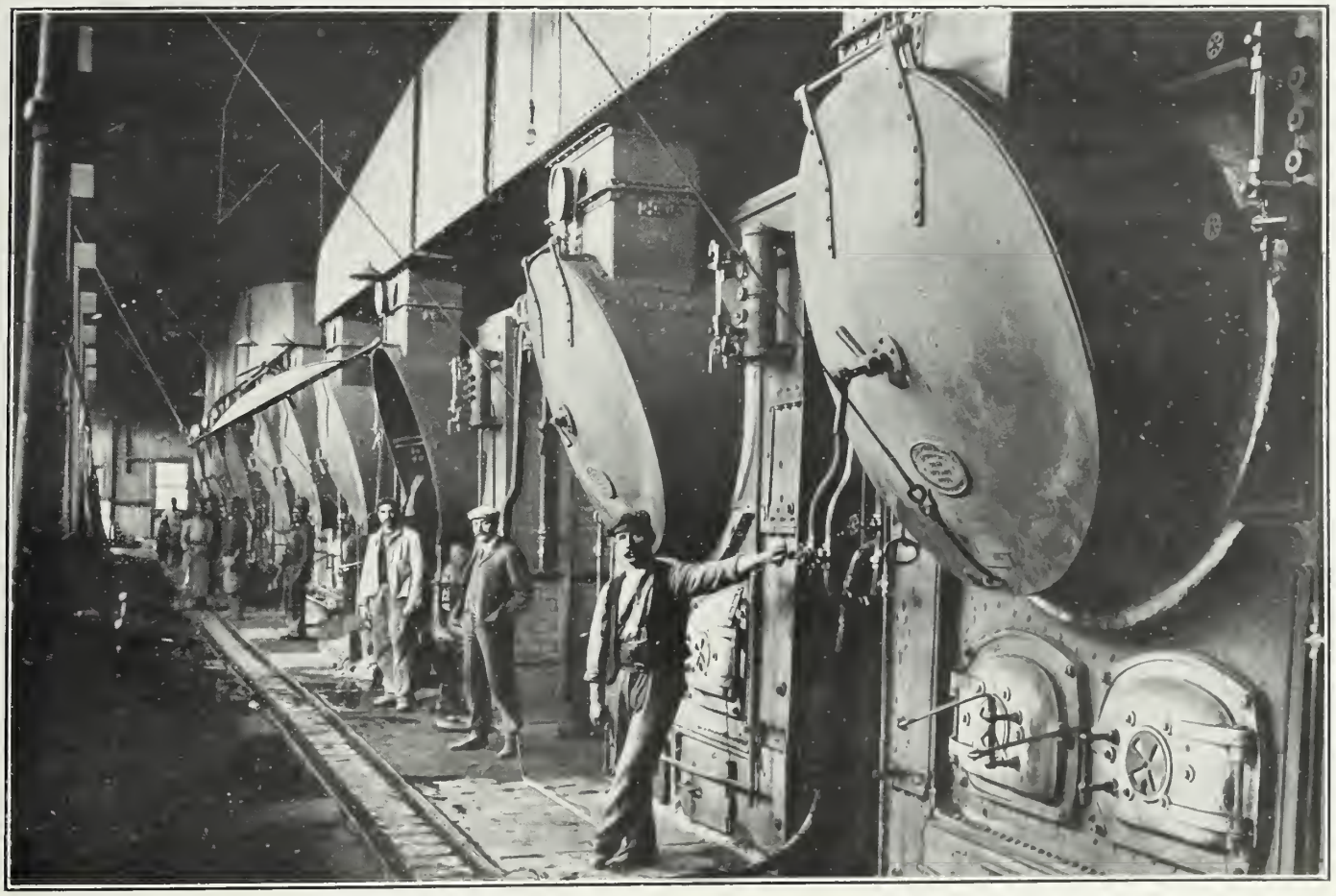
After shaft-sinking the next source of outlay is development, which should not, strictly speaking, be considered capital expenditure, but should be debited against working costs. By "development" is understood the rendering of the ore-bodies accessible to attack at every necessary point.

As, however, till the end of the "life" of the mine the reef has to be developed ahead of the requirements of the mill, it is better to consider the development that is carried out before the mill starts as capital expenditure; whilst, towards the end of the "life" of the mine, it is debited against working costs, so as to equalise matters again. Development should be regarded as a suspense account, and it cannot strictly be considered as capital expenditure, as the cost is recovered when the ore is crushed. Different mines adopt different methods of dealing with the development account during the crushing period. In some cases the ore as it is developed is paid for out of working costs, so that surplus development over the amount actually crushed makes the working costs appear higher than they really are, and if too little development is done the working costs appear too low. This is obviously a method that lends itself to grave abuse, and doubtless leads to the "bamboozlement" of shareholders. Other mines take the cost of the developed ore as nearly as possible at what it costs per ton to develop, and debit working costs accordingly. In such instance any surplus development must be regarded in the light of capital expenditure. Both methods have their advantages and disadvantages, but it is as well in looking into the affairs of a mine to understand exactly what method is adopted. The matter of apportioning the development costs per ton milled when a large percentage of the ore developed is unpayable, is also a very difficult problem, as it is often questionable whether certain areas in a mine will prove payable or not, even after they have been opened up. It would appear wise in all such cases to adopt an ultra-conservative policy in dealing with these matters, and where the mine is a fairly successful one there is no doubt that this is usually done. With a narrow reef, the costs per ton of ore developed are naturally high, as for a given footage a much smaller amount of ore is opened up. Where the reefs are narrow, therefore, a larger amount of capital must be locked up in development than is the case where wide reefs are encountered. Again, in a mine that is troubled much with "faults" and dykes the development costs are increased, as so much driving has to be done in barren ground, and often a lot of inconclusive prospecting has to be carried out in order to pick up the reef again after it has been lost. The estimating of the probable cost of developing a given tonnage of payable reef must therefore be a very rough one, as there are so many unforeseen factors that cannot be allowed for.

EXTRACTOR HOUSE, JUMPERS DEEP.

Surface Equipment.—On the surface, the cost of erecting a reduction plant, air compressors, and other necessary machinery, can be estimated pretty closely, and, as modern stamp mills do not vary a great deal from one another, the factor of error is a fairly small one. On a rough basis the cost of a reduction plant ready for running is reckoned at between £1,200 and £1,500 a stamp, and this allows fairly liberally for contingencies. Air-compressing machinery is an important item that has grown very much of late years, largely owing to the lack of native labour, and to the need to make up the deficiency by air-driven mechanism. In the matter of upkeep and renewals, perhaps the greatest expenditure is on boilers. Great care should be taken that the feed water is as little injurious

to them as possible. More attention might perhaps be paid to the way in which boilers are stoked, as in many instances coal is wasted by injudicious firing. In only few cases have automatic "stokers" been adopted, it being considered that as labour for this purpose is comparatively cheap in the country, and machinery very expensive, there is very little economic advantage to be gained by their use. Travelling belts are a comparatively new appliance on the Rand, and, although their renewal costs are rather heavy, they are very largely used, and there is no doubt that their adoption has proved a success.



BOILER HOUSE, JUMPERS DEEP.

As against the somewhat heavier capital expenditure of late years must be set the greatly improved extractions now being obtained. The use of slimes plant and tube mills has increased the extraction by at least 12 per cent., and has made all the difference between success and failure in many of the lower-grade mines. Great efforts are now being made to reduce the enormous expenditure in mine equipment, as it is realised that it acts very prejudicially against deep-level mining, especially at the present time, when it is not so easy to obtain capital for the fields as it was a few years ago. Although machinery is disposed of to the mines leaving very little profit to manufacturers, owing to keen competition, the expense of importation (in sea freight, and even more so in railway transport from the coast) adds very largely to the prime cost. In the erection of the machinery, also, skilled labour has to be very largely employed, and when one considers that this has to be paid for at from three to four times the English rates, it may be readily understood why the equipments on the Rand cost the huge sums they do.

(VI.) MINING FEATURES; MECHANICAL FEATURES.

MINING FEATURES.

Mining operations on the Rand are confronted with few serious difficulties, and the industry, compared with that of almost any other of the large fields of the world, appears to be particularly fortunate. Water is but seldom a source of expense and trouble; timbering is mainly confined to an occasional prop in the stopes. In the shafts the timbering is usually limited to separating from each other the different hoisting and pumping compartments, as the rock would stand without supports. Still, there are a few instances of treacherous ground being encountered. The dip of the reef of the Witwatersrand varies between about 70° on the Randfontein Estate properties and about 5° on the Geduld Mines, but the large proportion of ore is won from bodies dipping between 25 and 45°. The width of the stopes averages from 4 ft. to 5 ft., although in some few mines where the reefs are large they are stoped to 10 ft. or 12 ft.; in certain cases as much as 20 ft. is broken. In the Roodepoort district the pay-reef is very narrow, and when it is possible to obtain labour for hand-drilling the stopes are carried to as small as 30 inches; but this is exceptional. Small stopes must necessarily be worked by hand labour, because with machines the stopes cannot be

kept narrow, and profit would be wasted in removing worthless rock; but for stopes averaging 4 ft. 6 in. and over, rock drills are used, and are found to be more economical. The ore is developed by drives one above the other along the course of the reef, and by winzes connecting the drives. In the earlier history of the fields the drives were only 100 ft. apart, but of late years the distance has been largely increased. Where development is sufficiently advanced this is good policy, as the amount of ore developed per foot driven is increased, and the cost per ton of ore developed

levels where the dip of the reef is too flat to admit of the rock falling unaided to the box-holes—which are holes in the roofs of the levels connecting them with the stopes. Again, increasing the distance between winzes is only advisable when development is well ahead, otherwise too few points of attack are offered for the stoping of ore, and the effect on ventilation is prejudicial.

Another important and growing problem is that of tramming underground in the levels. In the older mines, as work proceeds, the ore is

the second-row deeps. Both drives and winzes are carried as far as possible on the ore-bodies themselves, thus simplifying their systematic sampling and valuing as development proceeds. Prospecting underground is largely carried on by small diamond drills, which are found very useful, not only in searching for new ore-bodies, but also in locating the reefs when dislocated by "faults" or dykes. Pillars of rock are left to support the ground above the cavities whence the ore has been removed; thus the quantity of timber used in some mines is very small. These pillars, of course, contain

STOPING, SOUTH REEF, JUMPERS DEEP.

(A view showing the average dip of the main reef.)

proportionately decreased. This policy, however, has its drawbacks, especially in flat-lying reefs, as it adds to the expense of removing the broken rock from the stopes to the levels (or drives along which the ore is transported to the shaft). The remedy is found in various mechanical appliances, such as shaking-shoots, aërial wire-rope transport, and similar devices. It is questionable, however, whether the attempt to reduce development costs by increasing the distance between the levels has not been rather overdone, and it is probable that 300 ft. is the greatest distance that should separate

taken from stopes situated further and further away from the shafts, and tramming costs increase. This will be greatly accentuated in "deep-deep"-level mines where the shafts are located half a mile or even further apart. The capital expenditure entailed in sinking these deep vertical shafts is such that they must each be made to serve as large an area as possible, and the larger the area served the heavier the tramming expenses underground. The mono-rail has been adopted on the Langlaagte Deep, and it is possible that this device will come into general use in the main galleries (or levels) of

a considerable proportion of pay-ore, and the number to be left in the mine will become a more and more serious point in proportion to the depth at which the reef gets worked out over large areas; for the greater the depth the more inadequate must pillars of normal size become to the weight of the overlying strata. A few cases of caving in of abandoned stopes have already occurred in some of the older outcrop mines, but no serious accident has as yet happened from this cause. There are frequently fatal accidents caused by the falling away of slabs of the hanging wall (or roof of the stope),

HEADGEAR, CITY & SUBURBAN.

(Destroyed by fire in 1905, and rebuilt during the year.)

General view of the City and Suburban Gold-mining Company's property from the "dump" (tailings heap).

but they have been individually of small extent, and of very local importance. This is quite a different thing from the possible crushing of pillars as increased weight comes upon them owing to the large percentage of reef removed.

Another mining problem that will grow more serious when the deeper-deeps are started is that of ventilation. It is proposed to feed 600 stamps from each 7-compartment shaft, and as the Government regulations require two shafts for a milling mine, it may be said that each shaft will have to circulate sufficient air to keep the atmosphere pure. When it is realised that the amount of explosives used and the number of men working underground are on a basis of keeping 1,200 stamps at work day and night, the problem is obviously no small one. There will be no insurmountable difficulty in doing this, but it will be impossible of accomplishment without the assistance of artificial ventilation. Up to the present, although great stress is laid, in the Transvaal Government Mine Manager's Examinations, on the importance of ventilation, it is not apparent that any effort is made to apply the principles in practice. In deep-level mines, after striking the reef, and until a connection is made with a second shaft, the condition of the atmosphere leaves much to be desired; it is only the exhaust air from the rock-drills that drives the foul air away at all, in sufficient quantities to render work possible.

MECHANICAL FEATURES.

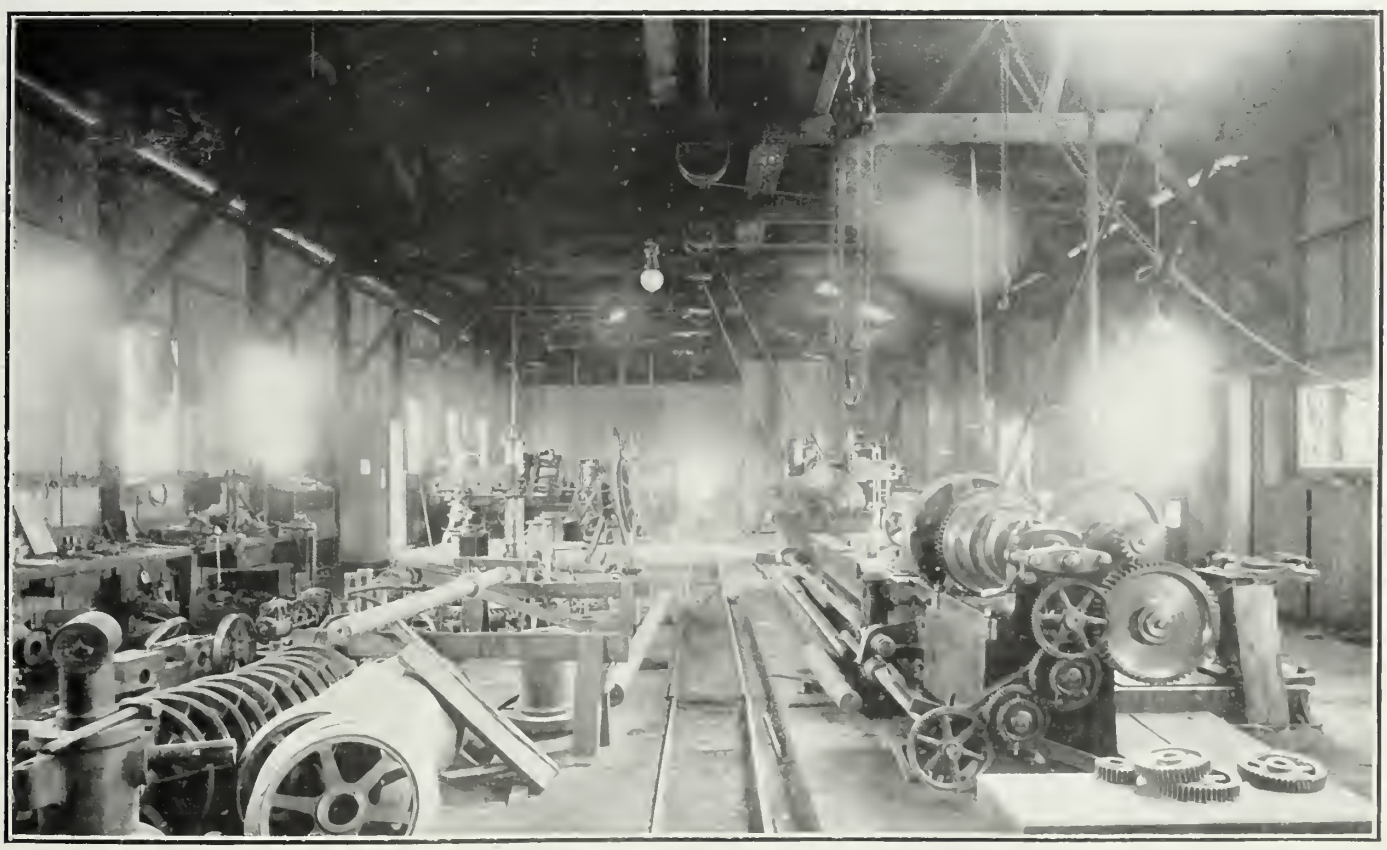
The mining machinery employed on the Witwatersrand Goldfields compares favourably with that in use in any mining centres of the world. Machinery is required for the purpose of developing power for (1) crushing the ore, and dealing with the finely-crushed "pulp"; (2) compressing air to work mechanism underground, and to promote ventilation; (3) hauling the rock from the working-face to the shaft, hoisting it to the surface, then carrying it to the mill; (4) pumping; (5) lighting, and sundry minor operations.

Milling.—Each stamp absorbs from $2\frac{1}{2}$ to $3\frac{1}{2}$ indicated horse power (i.h.p.) of energy in proportion to the weight of the stamp. The mill engine is usually arranged to drive the tailings-wheel, by which the pulp is lifted to a sufficient height to enable it to find its own way by gravity into the vats or tanks of the cyanide plant, where the finer particles of gold are caught by means of chemical reagents (a process termed "metallurgical" treatment). Before the ore reaches the mill it has to be broken to a convenient size, and the barren rock has to be separated. These operations are performed at the crusher-station and the sorting-station

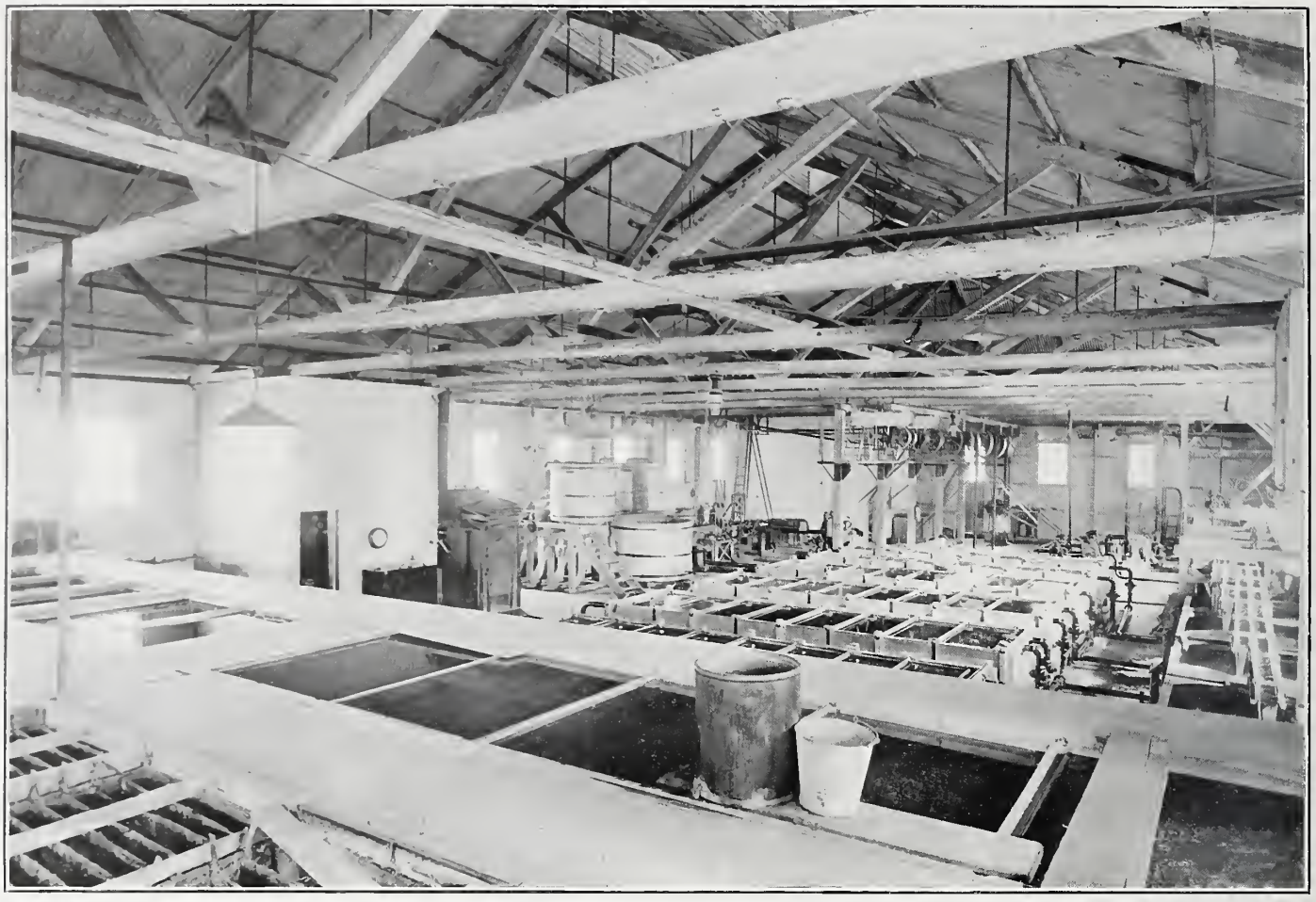
ASSAY OFFICE, DURBAN ROODEPOORT DEEP.

respectively, and motive power for them is often supplied from the mill engine. The type of engine usually adopted is the horizontal compound tandem Corliss engine, coupled directly to the line of shafting that works the mill. Occasionally superheated steam is used (as at the New Kleinfontein), but this is not usual. It being essential that a mill engine shall run continuously for at least a month at a stretch, such high-class machinery is erected

BATTERY AND DAM, ROSE DEEP.



FITTING-SHOP, ROSE DEEP.



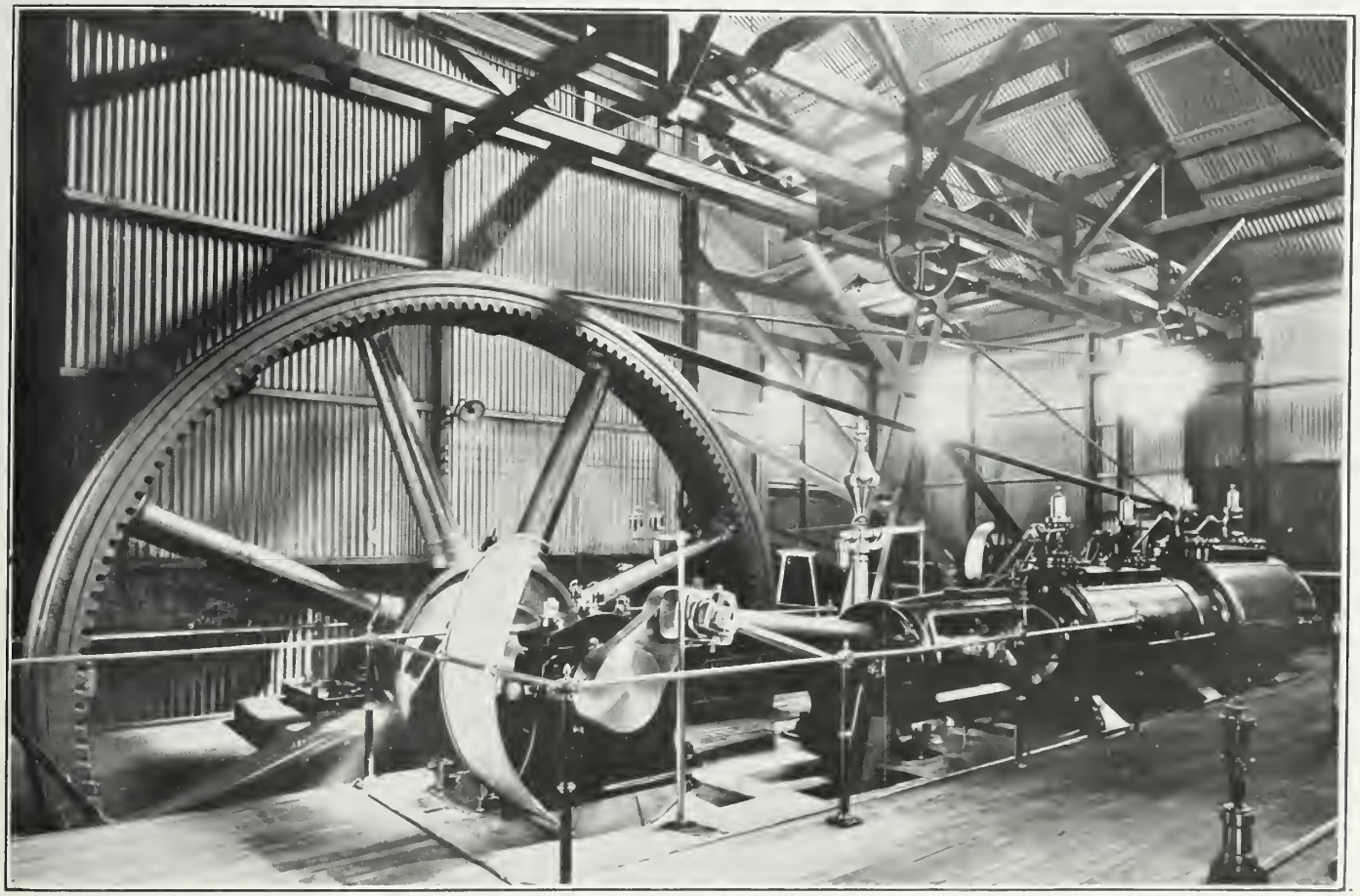
EXTRACTOR HOUSE, NOURSE DEEP.

that very seldom is a mill "hung up" owing to any breakdown of its engine.

Air Compressors.—As each rock-drill requires from 10 to 15 i.h.p. at the compressor to ensure a supply of air at a good pressure, and as there are in some mines over 100 rock-drills at work, it can be readily realised that a great deal of power is required for the compressors. This is a higher figure than should be the case, but much power is lost by leakages in the air pipes, and owing to the custom of turning on the air after a blast in order to clear away the fumes from the ends of drives or winzes. The most favoured types are the Riedler and the Walker engines, with horizontal compound steam and compound air cylinders. The air cylinders of the compressors are usually water-jacketed in order to keep down the temperature of the air. The rock-drill driven by compressed air is probably one of the most inefficient means of utilising power in modern use, and the amount of useful work available at the stope face underground in comparison with the energy exerted by the air-compressor at surface is exceedingly small. In spite of this, air-drills are largely used for the reason that no similar machine so satisfactory in other respects has been found. Electric drills have been repeatedly tried; they are certainly more economical of power, but the maintenance charges are high, and on the hard quartzite of the Witwatersrand fields they have not proved a success. One great advantage in the use of compressed air is that it assists in ventilating the mine, and in development work particularly this alone would outweigh many disadvantages. The usual air-pressure delivered at the drill is 80 lbs. to the square inch, but it frequently happens that the compressors are overworked, and the pressure available at the drill falls far below this amount.

Hoists.—In outcrops and the shallower deep-levels the hoisting problem is a very simple one. Almost invariably two cylinder cross-coupled engines are used, and the drums are of the usual cylindrical pattern. In the deeper mines, however, when the reef is struck at depths approximately 4,000 ft. beneath the surface, the hoisting problem is one of the most complicated and difficult that Rand engineers have to face. Tandem compound engines with two sets of cylinders, cross-coupled, fitted with Corliss valve-gear, are usually erected, but the drums are really the main difficulty. Of these, the ordinary cylindrical drum, the conical drum, and the Whiting hoist are used. The cylindrical drum has many disadvantages. The weight of the rope in the shaft is not balanced in any way unless a tail rope is employed, the drum is heavy, and therefore the engines must be very powerful to permit of speed being quickly attained after starting, and the strain on the face of the drum when some thousands of feet of rope are wound upon it becomes enormous. In sinking, of course, tail ropes cannot be used. Recently winding engine drums in use on the Rand have shown signs of collapse from this cause, although they had been specially designed for great depths. Greater strength means greater weight, which in turn means larger engines. The conical drum has the great advantage

that, as far as the engine is concerned, the weight of the rope in the shaft is largely counterbalanced, and it is thus possible to use smaller engines, and get up speed quickly. Moreover, the work done by the engines for every revolution is more nearly the same throughout the "wind," and they can therefore work for a large proportion of the time under normal load and economical conditions. The first cost of conical drums is high, and their weight is also considerable, but mechanically they are a great improvement on cylindrical drums without tail ropes. The Whiting hoist is a system frequently much decried, but it is apparently working satisfactorily on many of the deep-level mines. The weight of the drums is small, and they can be therefore readily started and stopped. Much trouble has been caused at times by the rope slipping on the drums, and it is said that the system entails a greater strain on the rope than that put upon it with drums of the other types, apart altogether from the greater strain caused by the increased quickness in starting and stopping. The whole question of deep-level winding was very fully discussed in 1902, on the occasion of the reading of a paper on the subject by Mr. H. C. Behr, but it cannot be said that any very conclusive decision was arrived at. The subject is perhaps of less importance locally than was at first anticipated, since there is a growing conviction that vertical shafts will not be sunk having a greater depth than 4,000 ft.; so that the problem of transporting to the surface, ore, from, say, the 6,000 ft. level is likely to be solved by vertical shafts being sunk to 4,000 ft., the lower levels being opened up by shafts sunk on the plane of the reef.



BATTERY ENGINE, NOURSE DEEP.

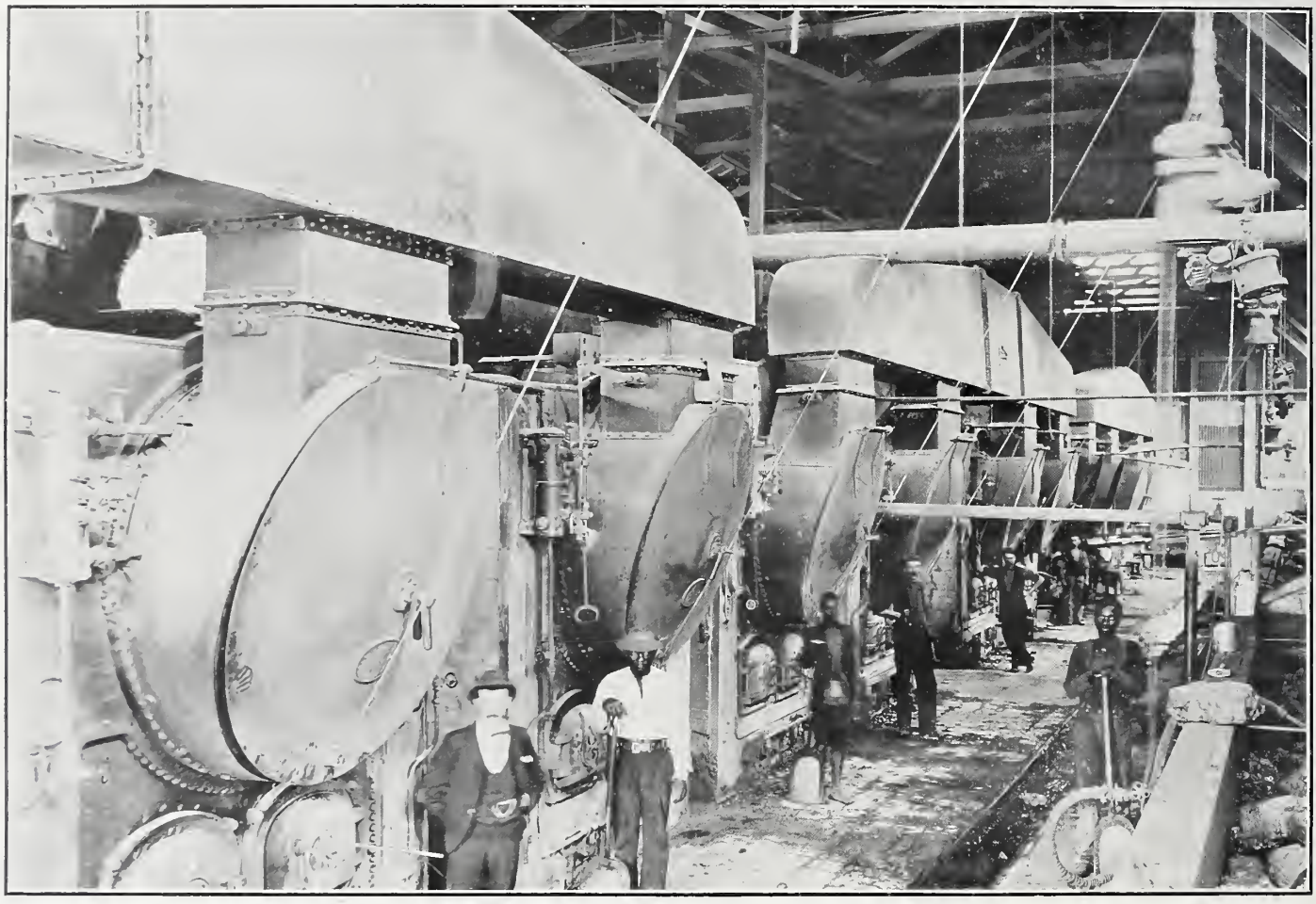
Pumping.—Where small quantities of water are met with, the cheapest (and the usual) method of bringing it to the surface is by hoisting (in other words, by baling it in special appliances attached to the skip or cage)—the hoisting engine being used a few hours daily for the purpose. For depths as low as 1,500 ft. there is no doubt that the Cornish pump is the most suitable. Its first cost is not great when the mine is not deep, its upkeep is small, it is absolutely reliable, and even if "drowned out" it will continue to work satisfactorily. For great depth the Cornish "pit-work" becomes very unwieldy and expensive, and pumps driven by electricity or compressed air are employed. The upkeep of these machines is considerable, and it is often necessary to install duplicates in case of breakdown. In instances of great depth, pumping is done in stages (that is to say, each specified section of the shaft is itself a complete self-contained pumping proposition, with its own pump, and discharge reservoir). The reason for this is that the pressure of a head of more than 700 or 800 feet of water is very great, necessitating heavy pipes, and the constant repair of joints—particularly in cases where the water is contaminated in the mine, and corrodes the metal-work of the pumping gear. Fortunately in only a few instances is the quantity of water in the deep-levels sufficient to necessitate a pumping plant, the hauling engines being usually able to cope with it by means of baling appliances.

Lighting and Minor Operations.—Electricity is everywhere used in the

mines for lighting, and it is also being much more generally adopted where small amounts of energy are required in isolated places. Some of the mines take large quantities of power from the Central Electrical supply stations which are located at various points along the Rand, and it is probable that in the near future this method of procuring power will be much more generally adopted for the driving of stamp-mills, and other industrial purposes. In many ways mechanical engineers on the Rand are inclined to be conservative. For instance, superheated steam is seldom used, and such proved successes as steam turbines are looked at askance, as though they were still in the experimental stage. In the transport of ore and tailings, the introduction of belt conveyors has been attended with marked success, and some mines have almost entirely discarded the truck-and-rail mechanical haulage in favour of these more modern appliances. In course of time these will no doubt be more generally adopted, as well as mechanical innovations in other directions.

(VII.) METALLURGICAL FEATURES.

All the gold ores at present being worked in the Transvaal are, when viewed from the standpoint of the metallurgist, of exceedingly simple mineralisation. In September, 1906, there were 65 mines producing within the Witwatersrand Goldfields. Of these, 61 mines were milling from the Main Reef Series alone, two mines (Lancaster and Lancaster West) were treating ore from both the Main Reef (Botha) Series and the Kimberley Reef (Battery) Series; the New Rietfontein confined itself to the Du Preez Series, and the Orion was solely a Black Reef proposition. The Heidelberg Goldfields had really three producers, although only two are named —the Nigel and Nigel Deep, working an ore-body very generally attributed to the Main Reef horizon—and the Coronation (at Edenkop), whose banket-bed has not yet been definitely correlated, and which is conventionally classed in the Chamber of Mines monthly output tables as in the Lydenburg district. The Klerksdorp fields had only one producer named—the Elandslaagte mine—but apparently an unnamed tributor running five stamps is entered under the heading of "Banks." The addition to these 70 mines producing gold from the conglomerates of six mines working on quartz-reefs brings at the date mentioned the total of producing gold mines in the Transvaal up to 76. Three quartz propositions are recorded as producers in the Barberton fields, and three in the Lydenburg fields. It is instructive to note that on these six quartz propositions the metallurgical processes employed are in all essentials identical with those obtaining on "banket" mines. It is thus apparent that the mineralisation of both the conglomerate ore-bodies and the auriferous quartz lodes is not only exceedingly simple, but quite remarkably similar in character. The following description of the metallurgical features of the Rand gold-mining industry may, therefore, be taken to apply in all essential points to the auriferous quartz mines of the Transvaal.



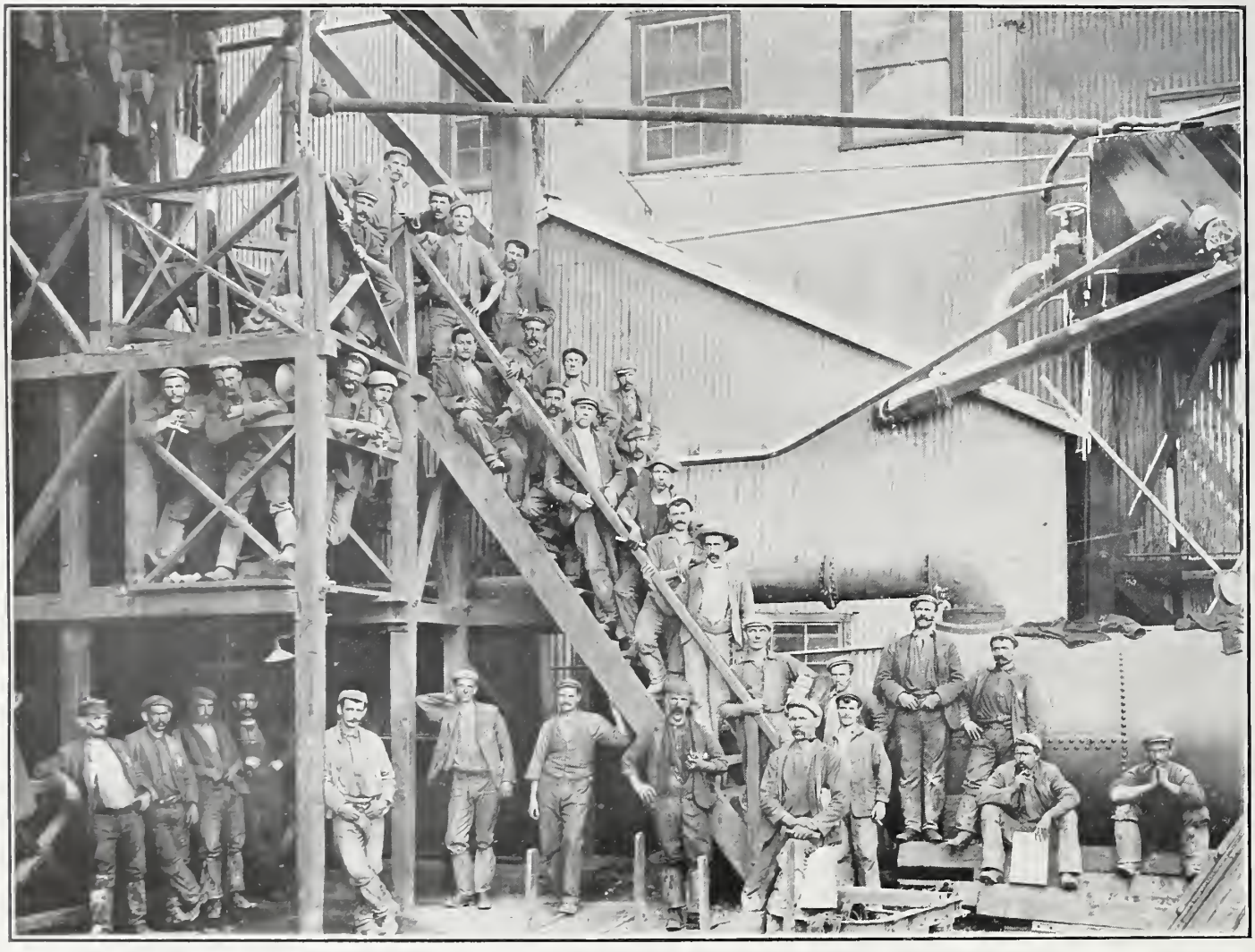
BOILER-HOUSE, NOURSE DEEP.

The simplicity of the mineralisation ensures that the outstanding features of Witwatersrand metallurgical treatment are mechanical rather than chemical. None of the refractory elements, which as tellurides, arsenides, complex sulphides, etc., have proved to be such bugbears in many other important gold-fields, exist in the beds of either the Main Reef, the Kimberley Reef, the Du Preez Reef, or the Black Reef Series, or in the quartz reefs (as at present exploited), in any appreciable quantity: consequently there is no need for the roasting of the ore, or for other expensive processes. In spite of these facts, however, and although in the latest and most approved plants as much as 94 per cent. of the total gold-contents are won, it has never been for one moment dreamt that finality has been reached in the matter of extraction. It is recognised that modifications in both the chemical and mechanical processes will be discovered which will not only secure an even higher proportion of extraction, but will by lessening working costs enlarge the margin of profit. To comprehend the features of Transvaal gold metallurgy the reader must follow the ore from its place in the unbroken reef to the refuse heap. The broken ore is moved from the "face" along the levels—usually in trucks—to the station at the shaft, where it is thrown into big boxes, or bins, from which it falls into skips (usually holding about three tons) which travel up and down the shaft, and in which it is raised to the surface. The skip is hauled to the top of the headgear and automatically tilted to permit of the rock falling into an ore-bin. Above the ore-bins is an arrangement of steel sizing bars known as a "grizzly," which separates from the coarsely-broken rock the smaller pieces and dust into which it has been shattered in the mine. The "fines" pass direct to the mill. The next stage is "sorting," when the coarser ore on its way millwards is passed slowly over a revolving table or belt, and as much waste rock as possible is thrown away after the broken rock has been thoroughly cleaned by a spray of water. The ore is conveyed automatically to the rock-breaker or stone-crusher, where it is reduced to a size sufficiently small to pass through a 4-inch ring. The broken pay-ore is then usually lifted afresh by means of a mechanical haulage working up a long inclined plane—to above the level of the mill, where it is stored in ore-bins large enough to keep the stamps fed for a number of hours. The discharge from these bins is carefully regulated by automatic feeders which deliver the ore slowly into the mortar-boxes, in which the stamps rise and fall about 95 times to the minute—crushing the ore in water till it is fine enough to pass through a screen showing from 400 to 1,000 holes to the square inch. This finely-crushed ore and water is known as the "mill pulp," which consists of fine sands and slimes. On passing the screens the pulp flows quietly over copper plates the surface of which is brightened with mercury, and any "free" gold is caught by the mercury, forming an amalgam that when properly "dressed" catches the exceedingly fine particles of free gold more readily than does the mercury alone. The greater part of the amalgam is scraped off the plates once a day. The proportion of the gold-contents of the ore that is caught in the mill varies with the "freeness" of the gold, but as a rule in the Transvaal 50 to 60 per cent. is thus won. Gold that is not free is termed "bound," and is either locked up in the grains of sand or so covered up with iron pyrites as not to be amenable to the action of the mercury. The problem of how to reach most cheaply this "bound" gold has been closely studied of recent years, with the result that secondary grinding of the pulp was decided upon. Experiments with the tube mill were

SINGLE MEN'S QUARTERS, NOURSE DEEP.

so successful that that appliance promises to come into general use for the purpose of reducing the ore to so fine a state as to liberate practically all its gold. The tube mill may be described as a cylinder about 22 ft. long and 5 ft. in diameter charged with pebbles: and when the mill pulp flows into this revolving cylinder the ore is re-ground by the pebbles into a state of slime. The free gold in the re-ground pulp is recovered by means of shaking amalgamation tables. The pulp on escaping from these tables is again lifted to a considerable height, usually by means of a revolving tailings wheel—its passage through the final stages of the treatment by means of the force of gravity alone being thus assured. After leaving the tailings wheel, a very small proportion of lime is added to the pulp, for the purpose of neutralising any slight acidity that may have been imparted to the ore while still in the mine, and the pulp passes through a series of boxes called spitzlutten, where it is classified by hydraulic means into three grades—concentrates (the heaviest), sands, and slimes (the lightest). The concentrates are sent back to the tube mill. The classification of the sands and slimes is further improved by the flow of the pulp through some V-shaped boxes, called spitzkasten. From these the sands are led to the vats of the cyanide plant. The slimes are treated freely with lime, the action of which causes the impalpable powder the ore has now been reduced into to settle in a further series of spitzkasten. The clear water decanted from the now flocculent slimes flows back to the mortar-boxes to re-commence its useful round. Both the sands and the slimes are treated in their own proper series of vats with a weak solution of cyanide of potassium (or of sodium), which leaches out the small amount of finely-divided gold present in them. and after the now practically valueless refuse has been washed, so as to remove the last trace of gold-bearing cyanide solution, it is removed as cheaply as possible to the refuse heaps which form so conspicuous a feature in the landscape of the Witwatersrand Goldfields. The appliances generally used to effect this removal are trucks moved by a mechanical rope haulage or belt-conveyors running up a pretty steep incline to above the top of the big tailings dump.

Before examining in greater detail the more interesting features of the operations already described, it is necessary to get an understanding of the development and application of the cyanide process, the successful establishment of which on a commercial scale is Johannesburg's epoch-making contribution to the industrial advancement of the world. The process is based upon the power of cyanogen



MINERS GOING ON SHIFT, GELDENHUIS DEEP.

in the presence of free oxygen to combine with gold into a soluble salt, the cyanogen being usually applied in the form of *potassium cyanide* (K Cy) or of *sodium cyanide*. The usually-accepted equation for the solution of the gold is Elsner's

$$4\ K\ Cy + Au_2 + O^1 + H_2O = 2\ K\ Au\ Cy_2 + 2\ K\ O\ H.$$

Boedlander suggests the following:—

$$2\ Au + 4\ K\ Cy + 2\ H_2\ O + {}^2O = 2\ Au\ Cy\ K\ Cy + {}^2K\ O\ H + H_2\ O_2,$$

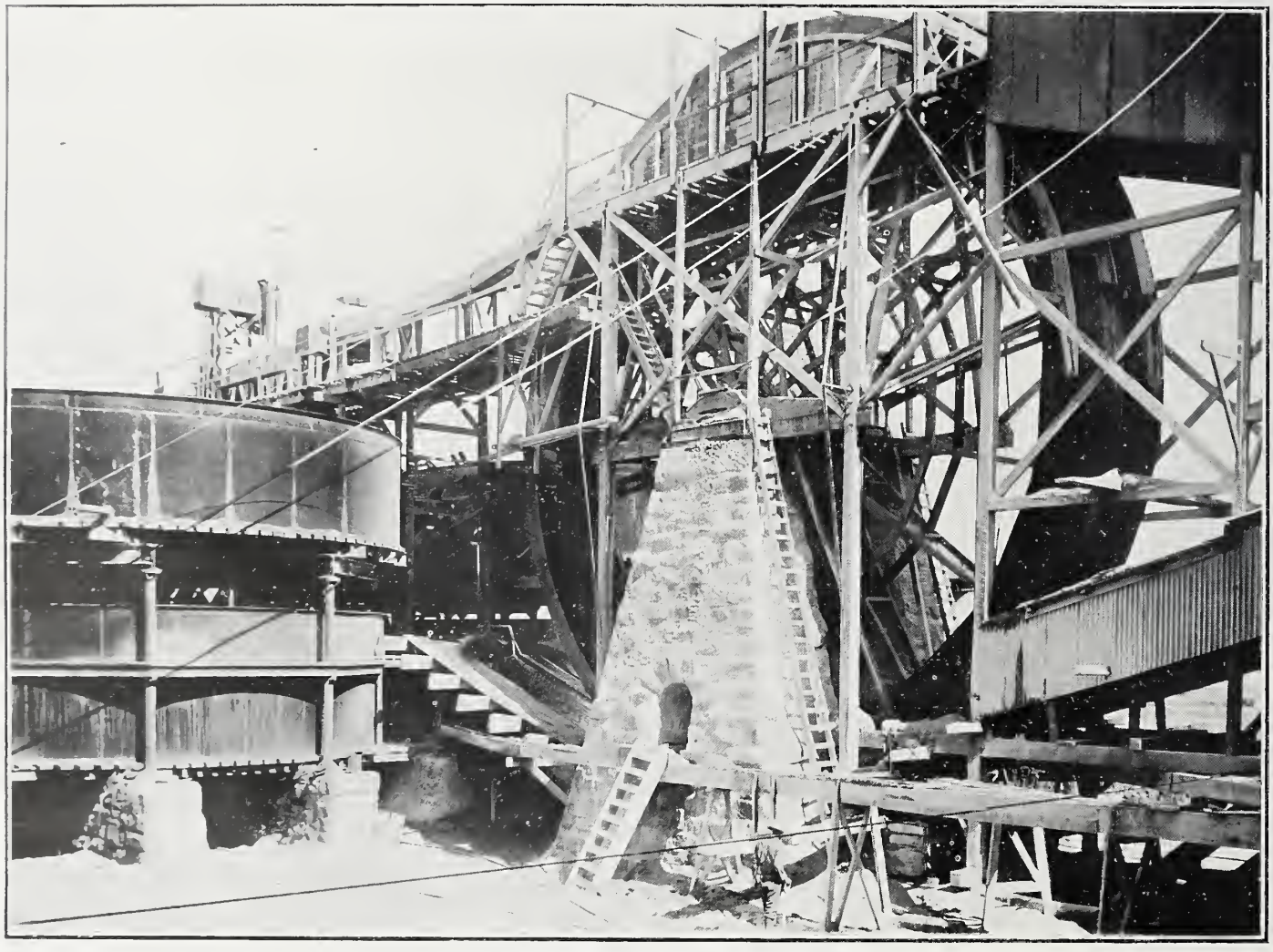
the hydrogen-peroxide acting on further gold as

$$2\ Au + K\ Cy + H_{2\ 0}\ O_2 = {}^2Au\ Cy\ K\ Cy + {}^2K\ O\ H.$$

The action of potassium cyanide on gold has been known for more than a century, and has been utilised for very many years, but the first patent for its use to extract the metal from ore was taken out by J. H. Rae in the United States in 1867. After various efforts had been made by different men in different parts of the world, success was achieved in Glasgow by J. S. MeArthur, R. Forrest, and W. Forrest. In May, 1890, the MeArthur-Forrest process of extraction by cyanide was introduced into the Witwatersrand fields by the South African Gold Recovery Syndicate, and, after some demonstration and experimental work at the Salisbury Battery, larger works at the Robinson mine and at the Sheba mine (Barberton) proved conclusively the remarkable commercial value of the process. At the time of its introduction the chlorination process was its only serious rival; but chlorination calls for very close concentration of the gold contents and roasting of the concentrates, and, moreover, precludes the winning of any but a small proportion of the appreciable percentage of silver present in the Transvaal gold ores. Although within the past year or two the metallurgy of the Rand conglomerates has been modified by the introduction of tube mills sufficiently to improve substantially the percentage of gold won by amalgamation, and virtually to eliminate the concentrates, as well as to increase in a marked degree the quantity of ore crushed, that metallurgy is very much the same in essentials as it was in 1891, the first year in which the cyanide process contributed a substantial quota to the output. In many directions improvements have been made, but the great and essential difference between the methods of the early nineties and those of the present day lies in the general expansion of crushing capacities. At first, stamp mills of 5, 10, 20, or perhaps 50 heads were employed. In 1895 there were seven batteries of 100 stamps and upwards at work. In July, 1906, there were 65 mines crushing and using 7,705 stamps, an average of 118 heads per property. The growth of 20 years is well demonstrated by contrasting the small 3-stamp battery erected south of the Wemmer in 1886 with the 400-head joint battery of the Knights Deep and Simmer & Jack East Companies, in which the majority of stamps weigh over 1,500 lbs. This latter crushing plant is replete with tube mills and other up-to-date accessories, and is the largest installation under one roof in the gold-mining world. Another feature of development in Rand metallurgy of recent years has been the improvement in methods of treating slimes. A few years ago slimes were a source of great worry to metallurgists, but to-day the treatment of these argillaceous products has been brought to a high degree of efficiency. Whereas a dozen years ago only two or three slimes plants were at work on the Rand, at the time of writing there are only 17 crushing mines not possessing slimes plants. During July, 1906, 31,145 oz. of gold were recovered from this source. In the earliest days of the Rand, amalgamation was the only method of recovery in vogue, and the knowledge that, as the free-milling outcrop ore was exhausted, and the payable zones of deeper level rock were drawn on, the treatment could be rendered more and more difficult and the extraction much less, was cause for anxiety to the pioneers. It was when doubts on this account were at their height that the cyanide process made

BATTERY AND CYANIDE TANKS, GELDENHUIS DEEP.

its opportune appearance. In 1891 the gold output from cyanide works was 34,800 oz.; in 1892, 160,168 oz.; in 1894, 587,400 oz. At the present rate of production, no less a quantity than 9,500,000 tons of sands and 3,950,000 tons of slimes are handled in cyanide works per annum for a combined output of 1,850,000 oz. of gold. From 1891 to 1903 (in which year the General Manager of the Albu group read a most important paper before the Chemical, Metallurgical, and Mining Society of South Africa) no changes in practice of any moment occurred. Between these years the cyanide process was developed most extensively, mills were increased, stamps made heavier, and the close concentration practised in the early nineties was gradually relaxed. The contribution above alluded to foreshadowed several important changes; indeed, the modification in practice which set in early in the year following the reading of the paper marked the dawn of far-reaching developments. Early in 1904 tube mills were started at the new Goch and the Glen Deep, in order to investigate the claims held out that finer grinding of the ore in a secondary mill would greatly improve metallurgical practice. The initial results obtained by these installations were so satisfactory that many of the larger mines ordered tube mills. At the time of writing about 60 tube mills were working along the Reef, and a few more were under order. That by their use conditions have been much improved is generally acknowledged.



TAILINGS WHEEL, CROWN DEEP.

It is of interest now to note features of special significance in the various operations.

Sorting.—The quantity of ore eliminated in the sorting stations depends upon many things—width of reef, labour available, adequacy or inadequacy of the sorting arrangements for the stamps employed, which vary greatly at different mines. The present proportion of ore rejected is about 16 per cent., in which variations from 5½ per cent. rejected by the Consolidated Langlaagte in July to 34 or 35 per cent. eliminated at the Princess find expression. Sorting has certain fixed economic limitations, and to determine the degree to which rejection of poor or barren rock should be carried in order to secure the largest profit, a host of factors—the tonnage *in situ*, capital involved, stamping capacity, and "life" of the mine, amongst others, have to be carefully considered.

Conveyance of Ore.—The next stage in operations (the conveyance of the ore from the rock-breaker to the mill bins) is typical of the general problem of the transport of ore and waste material. Among the various methods in use—mechanical haulage by wire rope, steam or electric locomotives, hoists, belt-conveyors, and so forth—it is the last-named that has

come into great favour recently. At some of the newer mines the ore after arrival at surface is handled almost entirely by conveyor belts. At the Robinson Deep the sands are also dealt with in this manner. Complete up-to-date belt plants are in operation at several mines—the Cason, New Goch, and New Kleinfontein being instances in point.

The Gravitation or Californian Stamp Mill.—These stamps weigh from 850 lbs. in the older batteries of the Rand to 1,550 lbs. in the latest mills. The majority of the batteries contain heads weighing about 1,250 lbs. each. The quantity of ore crushed by a stamp per day—its "duty," as it is termed—varies according to the weight of the stamps, the speed at which they are run, and the height of the drop, and also to a very considerable degree depends on the mesh of screening used through which the pulp escapes on to the amalgamating tables. The general size of screening in use is from 400 to 600 interstices to the square inch, but since the introduction of tube mills the battery managers of mines where these auxiliary crushers have been installed have been experimenting with various meshes, and it is very difficult at present to approximate an average. The heavy stamps of the Knights Deep Company, where tube mills are in use, crush about seven or eight tons a day, according to the mesh of screening used. At the New Luipaardsvlei Estate mill (of similar design) the stamps crushed 7·1 tons per day in July, 1906. The average for the Rand is about 5·3 tons per day. Since tube mills re-grind the pulp leaving the battery and recover gold over shaking amalgamation tables, the ore is crushed coarser in the stamp battery than was the case previous to 1904. This has meant the use of coarser screening, and it is consequently only natural to find that since tube mills have been extensively used stamp duty has improved noticeably. An interesting departure has been made from the normal practice of driving all stamp batteries by steam direct in the case of the Angelo and Cason mills (each 220 stamps), which are driven electrically. The innovation suggested is to attach the electric motor to each battery of 10 stamps, instead of running them by a line of shafting driven by a steam engine direct. Amongst the more obvious advantages is the simplicity with which any further increase of stamping equipment can be made. With the usual scheme, additions to the battery involves alteration of the line shafting and the impossibility of ensuring that the driving engine should run at what was designed to be its most economical load. One of several modifications in milling practice on the Albu group of mines is the re-introduction of crushing the ore at the New Goch and Meyer & Charlton mills in the presence of cyanide solution. This idea has been adopted in Western Australia, and is considered to economise in cyanide and to minimise the loss of gold. Dry crushing has been tried on the Witwatersrand at the Luipaardsvlei Estate and by one or two other companies, but the method was abandoned, and has now scarcely a single supporter.

Tube Mills.—The appliances of this nature are of varying makes and sizes, but the working principle of all is the same. Mills of the Krupp, Allis-Chalmers, Davidson, and Fraser & Chalmers types are the most common. The general size is 22 ft. long by 5 ft. in diameter. In the mill the pulp from the battery is re-ground by

OPEN CUTTING, CROWN REEF. The ore is lifted bodily in trucks and conveyed to the battery.
(This is the first and only mine on the Rand where such mode of getting the reef out has been put in operation.)

HEADGEAR AND "DUMP" OF WASTE ROCK, CROWN REEF.

(Mining timbers for supporting the stopes underground are shown in the forefront of the picture.)

pebbles. At first imported flints were used, but at a later date pebbles from local conglomerate beds were found to be much cheaper, and to give satisfactory results. Several mines are now using such pebbles. At the Robinson Deep, pieces of banket ore from the mine have been found to do efficient work, and the banket, of course, costs nothing; whereas, with two mills running, imported flints cost the Company about £100 per month. Experiments have also been carried out with linings manufactured from local material, and in this respect, too, it is thought the costly imported material can be dispensed with. Some idea of the beneficial results that have accrued to the mines by the use of tube mills is to be obtained from official statements made recently. It was declared that the mines of the Eckstein group had, since they were brought into use, increased their profits by from 1s. to 1s. 6d. per ton, improved the stamp duty by half a ton per day, and lowered the value of residues by half dwt. per ton. At the Robinson Deep the profit directly accruing to the Company through the use of two tube mills has been from £1,200 to £2,000 per month. These statements were made at a time when much less was known of tube mills, and the figures can therefore be safely taken as under-stating the value of tube mills rather than over-estimating it. There are still mines where the question of the advisability of installing tube mills is under consideration, and nothing is yet decided on, but this hesitancy is in nearly every instance the result of a due regard to capital expenditure rather than doubt as to the efficiency of the machines.

Amalgamation. — The Witwatersrand practice as regards battery amalgamation and the recovery of gold after leaving the tube mill plates is the same as in other parts of the world, excepting the mortar-box amalgamation is generally regarded as superfluous, and therefore seldom resorted to. The amalgam collected from the various copper plates daily is squeezed in a canvas cloth and the excess of mercury removed. The product is a hard ball consisting of some 30 per cent. of gold. Since the introduction of tube mills the proportion of gold won by amalgamation has increased the normal percentage of 50 or 60 by at least $2\frac{3}{4}$ per cent. About one-fourth of this gold is won from the "black sands" that collect on the copper plates, and are separately manipulated. The amalgam is heated in a retort when some 3,000 to 4,000 oz. have been collected, the mercury is driven off and re-condensed for further use, and the gold is recovered in a spongy mass. This gold is afterwards melted in a plumbago pot or crucible, and cast into a bar of bullion ready for shipment.

Tailings Wheel.—The general method of elevating the mill pulp is by means of the tailings wheel, which contains buckets or boxes for that purpose. On the East Rand Proprietary mines Pohlé air-lift pumps have proved most efficient substitutes, and at the Meyer & Charlton and New Goch mines elevator pumps are in use.

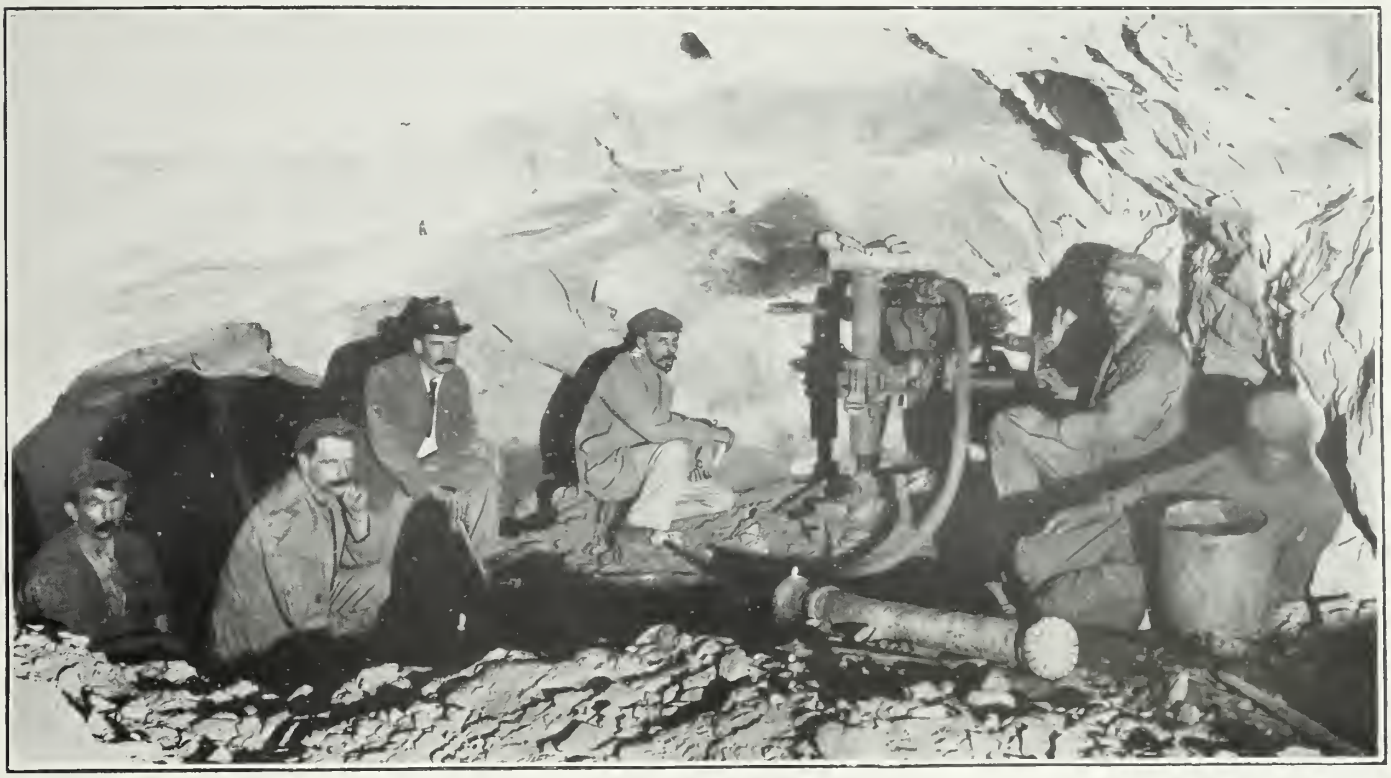
Mechanical Concentration.—On the question of concentration by means of mechanical appliances there has been considerable divergence of opinion, but the adoption of tube mills is apparently fast settling the question. Whereas at the beginning of 1906—that is, just prior to the starting up of a number of tube mills all along the Reef—the recovery from concentrates was 19,000 oz. monthly; in July of the same year only 8,740 oz. were won from this source, despite the great expansion of the industry between

these two periods. For some years it has been admitted that the close concentration of Rand ores has not much in its favour. Frue vanners, Scoular tables, and "gilt edge" concentrators of various types have been in use (indeed, Wilfley tables have been installed in the New Angelo and Cason equipments), but present-day practice looks askance at concentration, and the intermediate stage between milling and cyaniding is in most up-to-date reduction works simply classification. The rich concentrates won by such appliances are usually treated at the almost moribund chlorination plant of the Robinson Gold Mine. As evidencing the variety of opinion existing as to concentration, it may be noted that in May, 1894, a committee of investigation appointed by the Chamber of Mines reported that "concentration is usually a perfectly necessary process." Yet a decade later we have an acknowledged authority writing in its favour. Be that as it may, concentration is becoming more and more an exception.

Classification of Mill Pulp, or Sizing.—The more closely the products of classification can be graded to a uniform size, the more permeable the mass is to the cyanide solution, and the larger is the proportion of gold dissolved. For classifying mill products spitzlutten and spitzkasten (pointed boxes by which classification is effected by upward flowing water according to the specific gravities of the mineral constituents) are used. By the adoption of these hydraulic classifiers the pulp can be treated at trifling cost, the classification is efficiently carried out, and the products are most amenable to cyanide treatment—as contrasted with the products of concentration. The average percentage of sands classified is about seventy. The overflow from the spitzkasten carries the slimes, and these are either taken direct to the slimes plant, or (as is more usual) led into settling tanks, where the slimes accumulate and the water is returned to the mill. The sands are discharged from the spitzkasten and collected in the vats, either by Butters & Mein automatic distributors, or (more usually) by a hand rope distributor. In these vats or settling tanks the sands are thoroughly drained through filter-beds, and then removed to treatment vats, either through bottom discharge doors where the settling tanks are built over the treatment vats, or by trucking or belt-conveyance where the settling tanks are not super-imposed above the treatment tanks.

Cyanide Treatment.—In the treatment tanks the sands are subjected to percolation of cyanide of potassium solution, each charge of sands being given four or five washes of varying strengths. The highest strength of cyanide solution used is designated "the ·3 solution," which means that in every 100 lbs. of water three-tenths of a pound of potassium cyanide is dissolved. The general practice is to give each charge a treatment of nearly a week's duration. The cyanide solutions carrying the gold are then led to the extractor house, where the precious metal is precipitated on to zinc shavings. The Siemens-Halske process—electrical precipitation on to lead foil—is now a rarity on the Witwatersrand fields.

Gold Precipitation.—In order to release the gold from the zinc slimes the bulk of the zinc is got rid of by means of sulphuric acid, the slimes are then calcined, and finally fluxed and melted in a reverberatory furnace. This bullion is of considerably lower grade than that obtained by amalgamation. A few years ago a process was elaborated at the Bonanza mine whereby the gold and precipitating re-agents were smelted with lead and finally cupelled. Whilst it is claimed that by this method loss of gold is



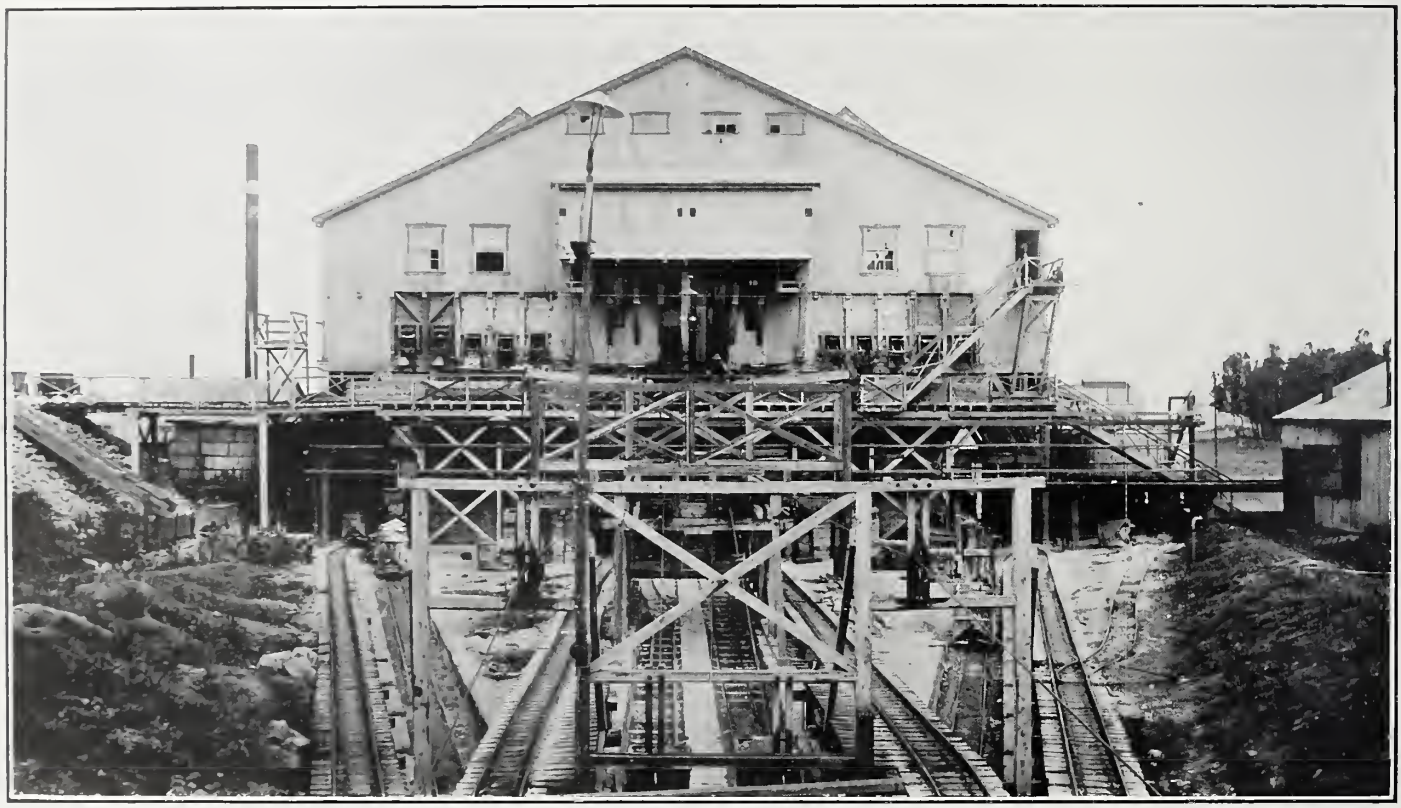
A PRACTICALLY FLAT STOPE IN THE GLEN DEEP.

(The Reef along the Rand is usually on an acute slope.)

minimised, there are certain disadvantages which hinder its general adoption.

Slimes Treatment.—As has already been remarked, the treatment of slimes has been brought up to a fine art during the past few years. About 31,000 oz. of gold are now recovered from slimes per month, and the cost per ton of treatment averaged about 2s. 3d. The overflow water carrying the slimes from the spitzkasten is in usual practice led into settling pits where the slimes are allowed to dry, and are subsequently subjected to saturation by cyanide solution, and the gold precipitated in the ordinary manner. Several innovations in slime treatment have recently been introduced at the Van Ryn, Meyer & Charlton, and New Goch mines, which are stated to provide continuously settlement of the argillaceous matter and solution of the gold; but it has been found necessary to pump back the slimes and re-settle it. Decantation is carried out in conical vats. Generally speaking, the Albu group (through its late consulting engineers) seems to favour in its slimes practice methods typical of Kalgoorlie metallurgy, with its use of filter-pressing, and its rigid economy of water in every direction. In settling-pits there is without doubt a large loss of water through evaporation and absorption, and water on many Witwatersrand mines is a great consideration. It is contended that by using the filter press the separation of the gold solution on the one hand and the slimes residue on the other is facilitated, and that the filter press constitutes the most desirable solution of the slimes problem. In addition to the mines above mentioned, filter pressing is practised at the May Consolidated. It is worth noting that filter pressing was tried on the Rand 14 years ago, but the results obtained from such experiments were unsatisfactory, and the method was abandoned. In filter presses the gold-bearing solution is squeezed out of the slimes and led to the extractor house. This modification of the Albu group is known as the "all-sliming" method, as its object is to do away with the sands treatment and reduce all the ore to an impalpable condition. It is claimed that the working costs for this scheme on Witwatersrand mines would show no increase above the ordinary, but that extraction might easily amount to many shillings per ton higher. The originators of the scheme further suggest that grinding pans may displace tube mills, and claim that by the adoption of all the suggested modifications a saving of 34 per cent. could be effected in the capital costs of the metallurgical plant, on the basis of 400 tons of ore treated per diem. The decantation system of slimes treatment is in operation at several of the larger mines. The Robinson plant, which cost £30,000, and deals with some 5,000 tons per day, is a good example of a modern slimes equipment. Many of the mines are now working over their accumulated slimes, and obtaining good profits from them.

Treatment of Residues.—There remains to be noted a last process—the treatment of residues. Just after the war, the metallurgical staff of the Crown Reef mine commenced experiments with a view to extracting gold from the tailings discarded by the Crown Reef reduction plant. Good results were obtained from these experiments, and a plant for dealing with the waste was erected, and has since been giving most satisfactory results. During the last financial year of the Company over 10,000 oz. of gold were recovered from this source for a profit of £34,741. The method of recovery known as the "Stark" process consists in saturating the dump with a patented solution, and precipitating the gold in the solution after a lengthy treatment. "Stark" plants have been erected at the Henry



ANGELO-DRIEFONTEIN CRUSHER STATION.

Nourse, Geldenhuis Estate, and Wemmer mines, and other companies are considering its adoption.

Metallurgical Working Costs.—A few words may be said as to the cost of treatment. This, naturally, varies at different mines according to the number of stamps in use, whether slimes are treated or not, etc. Roughly speaking, the cost of crushing, sorting, milling, and cyaniding for the whole Rand amounts to 5s. 9d. per ton, calculated on the basis of the tonnage milled. As the larger equipments get to work a reduction in this direction may of course be confidently looked for, although it would appear that Witwatersrand metallurgy has attained to such magnitude and generally sound organisation that no very sweeping reductions can be expected. The average actual extraction obtained along the Reef at the present time is probably in the neighbourhood of 90 per cent.; that is to say, out of every 20s. worth of gold in the ore sent to the battery, 18s. worth is recovered.

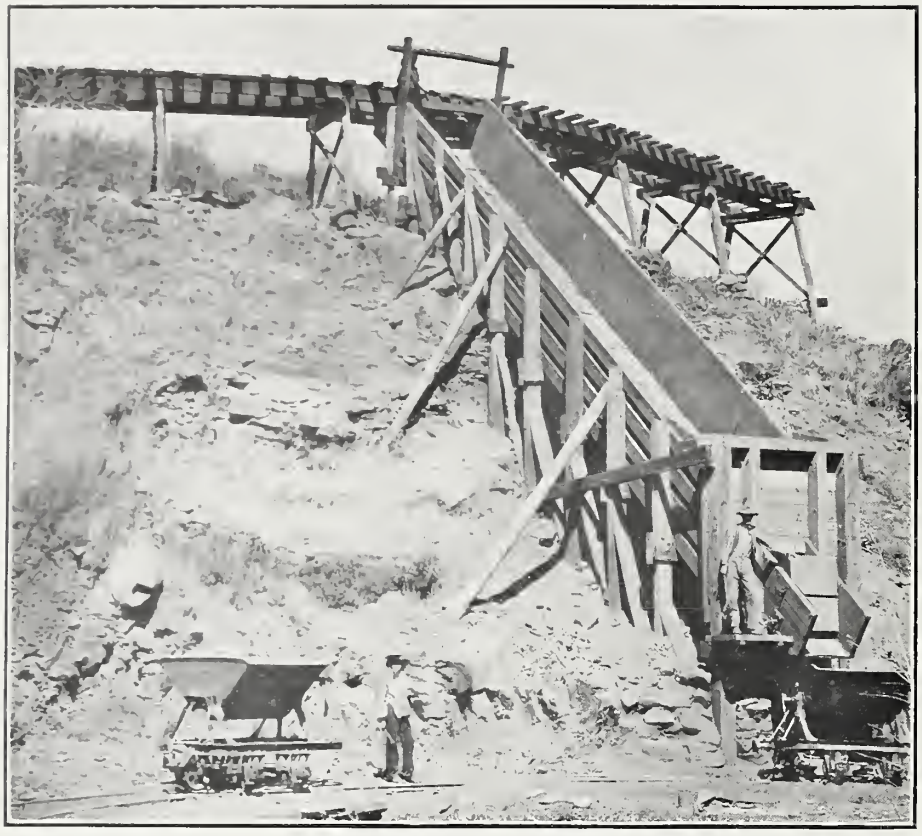
(VIII.) FINANCIAL FEATURES.

As has already been shown, the amount of money required to develop a Rand mine, and more particularly a deep-level proposition, is very great, and it is only with the support afforded by the large financial houses that such huge sums can be raised even in times of normal financial prosperity. When a deep-level mine is started it is customary for the controlling group to offer a part or the whole of the working capital shares to the public, or to existing shareholders if the company has already been floated, at a given price. In order to ensure the success of the new issue, the shares are guaranteed by the controlling house, so that any shares not taken up by the public will fall back to the guarantors. In return for this the guarantors will perhaps have the option of taking up a further number of shares, usually at a somewhat advanced price, during the ensuing six or twelve months. It seldom happens that the whole amount required to develop and equip a property is fully subscribed when operations commence, but it would have been sounder finance in many instances if this detail had been more carefully attended to. If, on exhaustion of the working capital originally subscribed, the "market" conditions are unfavourable for raising further funds, the mine must either close down until money can be procured, or the company must issue debentures, or the controlling "house" must lend the requisite sum—the "house," even in the case of debentures, being usually called upon to guarantee the issue. In these ways the financial groups have done much to help their companies when in financial difficulties, thus often saving them from complete collapse. During the Anglo-Boer war many companies were assisted in this way, and many of them are still largely in debt owing to this reason—in fact, in some instances the amounts lent were so large that it will take many years before the debts are liquidated and the companies concerned are again in a position to pay dividends to their

ANGELO-DRIEFONTEIN MINE.

(One of the modern mills, showing the way in which the men dress the plates.)

shareholders. Judged in the light of subsequent events, the way in which deep-levels have been financed reveals a great deal of reckless optimism,



Ore bin, Jubilee Mine, Pilgrim's Rest.

which has in the end cost shareholders very dear. Re-constructions have been necessary, and the capital amounts of the companies ruthlessly cut down, much to the disadvantage of the original investor.

While the financial houses have done much to help their subsidiary companies when in difficulties, these difficulties would in many instances not have arisen if a more prudent policy had been adopted in the first place. The groups are also supposed to lend stability to their companies by supporting the shares when they are adversely affected by falling markets, but this is done merely as the business interests of the controlling firm dictate, and not in a spirit of philanthropy towards the shareholders. The net result of the "group" system when spread over a number of years is that the public lose, whilst the groups always make money; and, although the groups are blamed for many of the results of their policy—often with a certain amount of justice—the public are assuredly equally culpable in rushing to buy shares at inflated prices, without first inquiring closely into the prospects of the companies in which they propose to become financially interested. Men who are quite prudent in their ordinary business dealings will often invest large sums of money in mining shares on the strength of the first street-corner "tip" they hear, and have only themselves to blame if they eventually lose heavily. The groups are run for business purposes (or, in other words, to make money), and the amateur who imagines he can "punt" in Kaffir shares to advantage must remember that the knowledge, the experience, and the resources are all on the other side. An investment in well-selected mining shares will perhaps give him a fair rate of interest, but as a quick road to wealth the "Kaffir market" should be avoided.

The disrepute into which the "Kaffir market" has fallen is without doubt partly owing to the rashness of the public in purchasing shares without making due investigations. Nothing is more certain than that those who have been the greatest offenders in this respect are often the loudest in condemning the Witwatersrand mining industry instead of some of those who are connected with it.

(IX.) THE "GROUP" SYSTEM ON THE RAND.

In the earlier history of the fields every mine was worked quite independently. The manager was his own consulting engineer, and laid out his plant and developed his mine in the manner he thought best—his board of directors, of course, controlling the purse-strings—and frequently interfering in a very arbitrary manner. There were no financial firms of standing, who made mining a speciality, controlling a number of properties, and by far the most of the mines were financed and worked by different interests. As the Rand developed, men controlling large capital appointed agents on the Witwatersrand to obtain for them promising holdings, and in this way grew the "house" of H. Eckstein & Co., who were the first on these fields to organise themselves, and who founded the first "group" of importance—the Rand Mines, Ltd. Messrs. Eckstein & Co.'s example was rapidly followed, and within a very few years there were established the "big houses" which control the majority of the mines of the Witwatersrand at the present time. They are: H. Eckstein & Co. (which includes the Rand Mines, Ltd.), the Consolidated Goldfields of South Africa, Ltd., and the

Tramline, Jubilee Mine, Pilgrim's Rest.

various interests held by the Barnato, Neumann, Goerz, Albu, Farrar, Robinson, Lewis & Marks, Berlein-Dettelbach, and some minor individuals and

associations, besides others that have have abandoned active participation in gold-mining on the Witwatersrand fields. Below are given the companies controlled by each of the above-mentioned associations. It will be seen that the list leaves very little to be divided amongst the smaller financial interests and the independent companies. The Rand Mines Subsidiaries are placed together as a section of the Eckstein control.

Starting on the west and proceeding east, the group interests are as follows:—

H. Eckstein & Co.—French Rand, Bantjes Consolidated Mines, Crown Reef, Bonanza, Robinson, Robinson Central Deep, Ferreira, Village Main Reef, Village Deep, City & Suburban, City Deep, South City, Suburban Deep, Wolhuter Deep, South Wolhuter, Klip Deep, Turf Mines, New Heriot, New Modderfontein, and Modderfontein Extension; the Rand Mines Subsidiaries, Durban Roodepoort Deep, Paarl Central, Langlaagte Deep, Crown Deep, Ferreira Deep, Nourse Mine, South Nourse, Jumpers Deep, Geldenhuis Deep, Rose Deep, and Glen Deep.

Consolidated Goldfields of South Africa, Ltd.—Luipaardsvlei Estate, Robinson Deep, Jupiter, Simmer & Jack West, Simmer & Jack Proprietary, South Geldenhuis Deep, South Rose Deep, Rand Victoria Mines, Rand Victoria East, Rand Mines Deep, Simmer East, and Knights Deep.

Barnato Bros.— Randfontein Deep, Roodepoort, New Unified, Consolidated Langlaagte, Langlaagte Royal, New Spes Bona, New Primrose, Glencairn, Witwatersrand, Ginsberg, New Rietfontein Estate, South Cinderella Deep.

Mine Quarters, Pilgrim's Rest.

S. Neumann & Co.—Vogelstruis Consolidated Deep, Consolidated Main Reef, Main Reef West, Main Reef Deep, Main Reef East, Langlaagte Block B Deep Level, Wolhuter, Treasury, Knight Central, Witwatersrand Deep, Driefontein Deep.

G. & L. Albu.—West Rand Mines, Violet, Roodepoort United, New Steyn Estate, Aurora West United, Meyer & Charlton, New Goch, Cinderella Deep, Rand Collieries, and Van Ryn.

A. Goerz & Co., Ltd.—Lancaster West, Lancaster, Tudor, Princess, Roodepoort Central Deep, Geldenhuis Estate, May Consolidated, Modderfontein Deep, Geduld Proprietary, Central Geduld, North Geduld, and Van Dyk Mines.

J. B. Robinson.—Langlaagte Estate, Randfontein Estates; with subsidiaries embracing the Stubbs, Porges, South, North, Robinson, Block A, Mynpacht, West, East, Ferguson, Van Hulsteyn, and Johnstone Randfonteins.

Farrar Bros.—East Rand Proprietary Mines, New Kleinfontein, Angelo Deep, Boksburg Gold Mines.

Lewis & Marks are very little interested on the Rand, their most important holding being East Rand Mining Estates, a concern controlling large areas of ground in the Springs district.

(The above list by no means exhausts the interests of the "big houses," as in addition they all hold large blocks of ground that have either not been "floated," or if floated have not yet in the form of shares been offered to the public. Many other smaller firms have important interests on the fields, but as they have not public prominence, and seldom have a controlling interest in any property, their names and various interests are not specially mentioned.)

A brief account of the history and present position of each of these leading firms may be of interest.

H. Eckstein & Co.'s is by far the most influential of the South African houses, and numbers among its subsidiaries most of the richer and more valuable mines on the fields. This was

Battery, Pilgrim's Rest.

the first firm to realise the potentialities of the deep-levels, and acquired with great secrecy and at very low prices the blocks of ground which were afterwards floated into the Rand Mines Subsidiaries. A glance at a map will show that the ground taken up by the Rand Mines companies was selected on the dip of highly successful outcrop properties. How sound was the judgment exercised is shown from the fact that all these mines on commencing to crush worked practically from the first at a profit. Thus the Durban Roodepoort Deep on the dip of the Durban Roodepoort and Roodepoort United Mines has for its outcrops the two richest mines on the Western Rand. The Langlaagte Deep, on the dip of the Langlaagte Estate, the Crown Deep of the Crown Reef, and the Ferreira Deep of the Ferreira, are further examples. Being first in the field, it is not surprising that Eckstein & Co. secured the cream of what ground was available. The Eckstein firm controls also many of the more valuable outcrops, as for instance the Crown Reef, Robinson, and Ferreira Mines, although it is not to be supposed that in all the mines managed by them they have the majority or even a large minority of the shares. The policy to be adopted on each mine of a group is decided by the controlling firm, such essentials as the most suitable equipment and manner of laying out the mine being arranged by the consulting engineers, subject to the approval of the Board, which consists mainly of nominees or members of the controlling house. The resident manager has a certain policy outlined to him, and it is his duty to carry it out in detail, the outstanding features being framed by the headquarters staff of experts. Such matters as the designing, arranging, and ordering of the machinery and plant required for a mine are carried out at headquarters, and the leading groups retain a large technical staff for this purpose. The staff naturally has every facility for collecting many reliable data, and of acquiring a great deal of experience of their particular work; therefore the work should be more efficiently and reliably carried out under this method of centralisation, when intelligently applied. Experiments in metallurgy and other branches of the industry can be made with advantage under the group system. The work is carried out on one property, but all the other mines share not only in the expense but also in the experience, and reap the benefit when any discovery of value is made. In matters of finance, possibly the group system has most advantages. When a company requires more funds it is customary for the controlling house to guarantee the issue of new shares at a fixed price, or to guarantee to take up any debentures that may not be absorbed by the public; or, if the market conditions are unfavourable for obtaining fresh cash from the public, the groups often lend money to their subsidiaries. This was very largely done during the war, and —since that period—on occasions when "Kaffir" shares were out of favour and money unobtainable from the public.

The Clewer Mine, Pilgrim's Rest.

Consolidated Goldfields of South Africa.—With the exception of the Simmer & Jack Proprietary, all the main holdings of this corporation are deep-level mines. It has interests in, and generally speaking controls, nearly all the deep-level ground lying between Johannesburg and Germiston. It has small interests to the south of Randfontein on the farm Middelvlei, and also holds blocks of shares in the Boksburg Gold Mines, Kleinfontein Deep, and Van Ryn Deep. The Robinson Deep and Simmer & Jack are this group's chief profit-earners, and are two of the most important mines on the fields. The Knights Deep, the Simmer East, and the Luipaardsvlei Estates are also working at a profit, but the group has many large deep-level properties still in the earlier development stages. Some, such as the Jupiter and the Simmer West, started as far back as ten years ago, but owing to the war, want of labour, and other unforeseen difficulties, they are still "marking time." A deep level striking the reef at a depth of 2,000 ft. should be in a position to

Mac-Mac Falls, near Pilgrim's Rest.

start milling in a little over three years from the commencement of operations, provided the work can be pushed forward continuously. There is always some uncertainty in shaft-sinking, as to what the work will cost, and the time it will take. If water in quantity is encountered, costs increase enormously, and the rate of sinking is very slow. It is usual when the shaft has gone through the water-carrying strata to cut a ring round the shaft to catch the water, which is pumped to the surface without reaching the bottom of the shaft at all. It frequently happens, therefore, that a shaft may be quite dry at the bottom, while perhaps water is continually pouring in 1,000 ft. higher up. The Consolidated Goldfields has been the pioneer of the policy of the big stamp-mill. Its Simmer & Jack mill of 320 stamps was for a long time the largest on the fields, but its size is now exceeded by the joint mill of the Knights Deep and Simmer East, which has 400 stamps. The group under notice has also been one of the first to adopt improvements in metallurgical processes, in spite of its policy in this respect having always been a cautious one.

View of Pilgrim's Rest.

"Boys" at Beta Mine, Pilgrim's Rest.

BARNATO'S.—The firm of Barnato Bros. has perhaps greater cash resources than any other South African house. The mines it controls are with few exceptions of no very great importance. Its most valuable holding consists of Ferreira Deep shares, although the control of this property is in other hands. It holds a large number of undeveloped claims. Its most important producing mines are the New Primrose, the Witwatersrand, and the New Rietfontein. The New Rietfontein, an amalgamation of the Rietfontein A, the Rietfontein B, and the old Rietfontein Estates, works the Du Preez Reef, a banket formation lying some two or three miles north of the Main Reef Series, from which it is markedly distinct in character. Its continuity has never been satisfactorily traced beyond the limits of the Rietfontein property, although many of those who seek interests outside the established groove of Rand mining practice have persuaded themselves that they have struck it, north of the Main Reef in other parts of the Rand. By many thoughtful observers the Du Preez Series is now regarded as an outlier of a geological system more recent than that of the Witwatersrand Beds, and as quite unlikely to be traced—excepting accidentally—north of that formation; in fact, it is contended that its true horizon on these fields lies considerably south of the Main Reef. It has not yet been definitely identified in any other part of the Rand. The gold-bearer is a very thin layer, and is often difficult to follow, but the values are in many places exceedingly high. The Barnato firm has large interests on the farm Leeuwpoort, on the dip of the East Rand Proprietary, and the Boksburg Gold Mines properties. The holdings are all of deep-level character, but the district is a promising one, and may in the future be the centre of great activity. The Consolidated Langlaagte, New Unified, and Roodepoort Mines are low-grade propositions dependent largely on a general reduction in working costs to make satisfactory profits. The New Spes Bona and Balmoral are two very unfortunate properties, both so heavily in debt to the controlling firm that the shareholders have little chance of seeing anything in the way of dividends. Outside of the Rand, Barnato's have important interests in the Klerksdorp district, amongst which is the Buffelsdoorn Consolidated Mines. This property, although not worked since the war, excepting for its accumulated slimes, was at one time an important producer, and made considerable profits.

NEUMANN.—This group controls no mines of really high grade, its principal profit-earners being the Wolhuter, the Witwatersrand Deep, and the Con-

solidated Main Reef mines. On the far East Rand sinking operations are being pushed forward on the farm Cloverfield, adjoining Geduld, and it is hoped the results when the reef is struck will be equal to the borehole assays, which were highly satisfactory. The group's numerous smaller interests in other sections of the Rand will doubtless be developed when more favourable conditions obtain.

Ore bin, Peach Tree Mine, Pilgrim's Rest.

ALBU.—This group has certainly sprung into greater prominence of late years, and is distinguished by a courageous initiative in experimenting with, and adopting, improvements in both mining and metallurgy. More particularly has this been so with regard to the latter, and its engineers have made important experiments in the metallurgical treatment of concentrates and slimes. A few years ago, the General Mining and Finance Corporation (as the Albu concern is entitled) purchased the controlling interest in the Rand Collieries property from Freeman Cohen's Consolidated, this constituting almost the only important change of control among Rand companies since the war.

The West Rand mines and the Violet ground, which are to be worked together, are an amalgamation of a large number of smaller interests, and constitute the largest block of outcrop claims it has ever been proposed to work as one undertaking. A mill of 1,000 stamps has been proposed for this property, but lack of labour has up to the present prevented any of these plans being proceeded with.

GOERZ.—This group has two good profit-earning mines, the May Consolidated and Geldenhuis Estate. It has, however, been very unfortunate with others of its subsidiaries, which became so heavily in debt during the war that they will not be in a position to pay dividends for years to come unless it is possible to re-construct, or obtain cash by further over-capitalisation. Developments on Geduld have not come up to expectations. All things considered, the Goerz group holdings on the Rand have proved rather disappointing of late. What may quite likely prove to be its most important venture, the Van Dyk Mines (situated south-east of Boksburg, on the farm Witpoort), must for the present be regarded as speculative. Shaft-sinking is proceeding, and the reef should be struck in six months or so.

ROBINSON.—The Robinson group controls the Langlaagte Estate, but its most important holding is on the farm Randfontein, south-west of Krugersdorp. The latter undertaking —itself a parent company—controls, and in many cases is sole owner of, a line of subsidiary properties extending for some six miles along the outcrop of the Main Reef. Four of these subsidiaries are at present crushing, and making good profits, but the eight remaining companies are idle owing to want of labour. The Randfontein Estates, although a company with enormous potentialities, has never paid a dividend during its existence of nearly 20 years. For this reason the stock is very unpopular, especially locally, and it is considered by many that if a more progressive policy had been adopted the company would be in a much more satisfactory position. The Robinson group was the last to adopt sorting on its mines, and it is one of the few "big houses" that has in no department ever acted as pioneer in the introduction of improvements or economics.

FARRAR.—The Farrar interests are confined entirely to the East Rand, the most important being the East Rand Proprietary Mines, with four subsidiaries—the Driefontein Consolidated, the Angelo, the New Comet, and the Cason mines. These four mines are all fully equipped, not to say over-equipped. For a few years, at any rate, this section of the Rand will be an important producer. The other producing mine, the New Kleinfontein, is now dropping all its stamps, and as this mine, too, has a very fine equipment, and has no debt to wipe off, it should prove a steady profit earner for a long time to come.

INDEPENDENT MINES.—There are a few mines that have never been absorbed by any group—for example, the Durban Roodepoort, the Vogelstruis Estate, the Salisbury, and the Jubilee—but they are outcrop mines, and in most cases are approaching exhaustion. The independent mines

View from the outskirts of Jeppestown, showing line of reef towards Boksburg.

INCLINE GEAR TO SERVE ORE TO THE MILL, VILLAGE DEEP.

are as a rule well managed, and working costs are lower than on similarly situated mines controlled by the groups. Under this heading one might refer to the mines on the Black Reef, to the south of Johannesburg. The ground was taken up by various companies in the early days of the Rand, the reef was opened, and mills were erected, but in the majority of cases the crushing results were very irregular. Some few mines did well for a time, but for several years prior to the war all work was suspended, and Black Reef propositions were regarded with disfavour. Quite recently the Orion, one of the most successful mines in the early days, has again been worked, and is giving highly payable returns. As a result of this, other properties on the line are being inquired after. A hitherto unrecognised gold-carrier has lately been struck on the footwall of the Black Reef. Good values have been obtained in places some miles apart, but it is, at present, impossible to say whether the reef will ultimately prove of permanent importance.

To the south of Roodepoort, rich patches of conglomerate have been worked in a desultory way on what is known as the Steyn Estate Reef. The true geological position of this formation is not yet settled, but it is generally correlated with the Elsburg Series. This uncertainty arises chiefly from the region of its occurrence being very much disturbed. The amount of development done is small, the evidence it afforded is inconclusive, and the results obtained were not very encouraging.

(X.) THE VALUATION OF MINES.

Shareholders in mines exploiting the Rand and kindred formations have special facilities for arriving at an effective, if somewhat rough, valuation of the ventures they are interested in. The features characterising the banket formation differ materially from those of other kinds of gold reefs, and permit of calculations dealing with the thickness and value of the ore-bodies that have a rough accuracy in general application placing the Witwatersrand industry upon a basis practically unique amongst metalliferous mining ventures. With some acquaintance with the main factors of such systems of computation, the shareholder who takes sufficient trouble to familiarise himself with the voluminous, accurate —and, as a rule, luminous—reports and balance-sheets issued by both the mines and the Government Mines Department, should be able independently to gauge the present value of his holding and of the unworked portions of any particular property. That the trouble needful to secure this information is inconsiderable is demonstrated by the fact that in probably no other industry in the world is information of so accurate a description issued so unreservedly and so frequently. In the hope that the average shareholder may be led to see how easily and safely he may form his own opinion and estimate upon and concerning "Kaffir" ventures, a few data are now given respecting the nature and importance of the various factors affecting the banket proposition, with rough methods of how to apply them.

A "reef" (or metalliferous) mining claim, according to Transvaal Law, measures 400 ft. by 150 ft. (Cape measurement)—100 Cape feet being equivalent roughly to 103⅓ English feet—the shorter length being measured along the strike (or direction of outcrop) of the ore-body. A reef claim is therefore equal to 60,000 square Cape feet, or to 64,025 square English feet. The claim boundaries, as carried down by the plumb-bob, may be followed into the earth as deep

as the claim-holder cares to go, but he has no right to follow the dip of the reef outside these vertical boundaries. In this direction the Transvaal Law differs from that of Rhodesia and the United States of America, but it is in many respects preferable, as it does not lend itself so readily to disputes and consequent litigation. Given the superficial area of a claim, it is a simple matter to calculate the tonnage per claim, where the average thickness and dip of the reef are given. From tests made with average banket it appears that 12 cubic feet weigh 2,000 pounds avoirdupois, or a short ton, which is the unit adopted on the Rand for mining purposes. From these data can be obtained the following figures of tonnage per claim for different dips, a reef thickness of 1 ft. being postulated :—

Dip Degrees.	*Tons per claim.*
0 (horizontal)	5,335
5	5,356
10	5,418
15	5,524
20	5,678
25	5,887
30	6,160
35	6,573
40	6,965
45	7,546
50	8,300
55	9,302
60	10,671
65	12,625
70	15,600
75	20,615
80	30,725
85	61,217
90 (vertical)	64,562

Where the reef dips very steeply at or near the vertical, a depth of 5,000 ft. is assumed as the limit of profitable mining. Given the number of reef claims, the average dip, and the average reef thickness, the total number of tons of ore in the mine can be calculated. From 10 per cent. to 20 per cent., and in some cases still more, must be deducted from the result of this calculation to allow for loss of ore from "faults" and dykes, and also for the ore left in the mine as "pillars." In some mines, also, deduction must be made for unpayable ore (which generally occurs in "zones," or large "chutes"), and this naturally varies greatly in different mines. The rate of crushing can be found from the size of the mill, but particulars must be obtained as to the age of the mill and the weight of the stamps, the older mills having light stamps, and the "duty," or tonnage crushed per stamp head, being in direct proportion to the weight of the stamp. The older type of mill does not crush more per 100 stamps than 150,000 tons annually; the latest type of stamp-mill, with tube-mills attached, crush annually 220,000 tons per 100 stamps. The value per ton to be obtained from the ore is sometimes given in the reports, or it is deducible from previous milling results. A good rule to take, however, in order to keep on the safe or conservative side in calculating, is to assume that for every dwt. value of the ore in the mine the extraction will be equal to 3s. For example: 10 dwts. ore in the mine will give an extraction value of 30s. This rule applies with rough accuracy when no sorting is done, but when sorting is carried out the actual extraction will be higher in proportion to the percentage of waste rock removed. The value of a dwt. of fine (or chemically pure) gold is about 4s. 3d., and the reason why this full value per ton is not obtained is owing to incomplete extraction, and also to the fact that a certain proportion of waste (barren rock) finds its way to the mill, and thereby reduces the actual gold-value per ton; in other words, the gold in the ore at the mill is spread over a larger tonnage than it was when sampled in the mine, when only clean reef was meant to be taken. When very wide reefs are worked, this discrepancy is less noticeable, as a smaller percentage of waste gets broken with the ore. The percentage of waste broken varies in different mines even when the reef widths are the same, depending as it does on the nature of the hanging wall (roof of the working), which in some cases is good (firm), while in others it continually breaks off in flakes and slabs, and gets mixed with the pay-rock. Any marked reduction in the value obtained in the mill is therefore usually accompanied by a corresponding increase in the tonnage, assuming always that the sampling has been accurately carried out. Although occasionally mistakes have been made in sampling, the results published by the majority of companies are as accurate as in the nature of things they could reasonably be expected to be.

TAILINGS HEAP AND MINE DAM, WEMMER.

Working costs depend on many circumstances, and low working costs by no means necessarily imply good management. Ideal conditions for low working costs are a wide reef, absence of "faulting" and dykes, a dip of over 30°, a large mill, and an up-to-date equipment. A fairly steep dip saves a great deal of expense in shovelling broken ore down the stopes into the trucks in the levels, and enables the levels to be placed further apart, without increasing the shovelling costs, as the rock slides down to the box-holes of its own accord. The data required to value a crushing mine are arrived at as shown above. Having obtained the total tons in the mine, the rate of crushing, and the probable grade and working costs, it is a simple matter to find approximately the total profit to be earned, and the "life" of the mine at this rate of working. These figures by themselves do not, however, give the present value of the mine, since the dividends have to be spread over a number of years, and must be discounted accordingly. By the use of discount tables these present values can readily be estimated. Perhaps the most useful of these tables for the purpose in view is that compiled by R. R. Mabson, in his "Mines of the Transvaal." This table, which is given below, shows the factors by which the annual dividend must be multiplied in order to return from 6 to 10 per cent. at simple interest, and to redeem capital at 5 per cent.

As the meaning of the term "redemption of capital at 5 per cent." is not always clearly understood, it is as well to explain it as briefly as possible. To take an example:—A rate of interest of 10 per cent. with 5 per cent. redemption of capital will be assumed. It is further assumed that £100 is invested in a mine which will pay equal annual dividends for 15 years before becoming exhausted. This means that £10 will be paid every year for the full 15 years as interest on the £100 invested. But over and above this £10 a further sum must annually be set aside as a sinking fund. The money put to the sinking fund is re-invested at 5 per cent., and must be so proportioned that at the end of the 15 years the sinking fund amounts to £100, or the sum originally invested. Thus the investor will have received his 10 per cent. throughout the "life" of the mine, and at the end of the period will have his £100 back. It will be seen that the higher the rate of interest at which the redemption money is re-invested, the smaller the amount that has to go to the sinking fund every year; so that a rate of 10 per cent. interest with 5 per cent. redemption is a lower return than 10 per cent. interest with, say, 3 per cent. redemption. The following example in mine valuation demonstrates how the calculations are worked out:—

Assumption:—

Mine with 200 claims.
Average reef width, 4 ft.; dip of reef, 30°.
Allow 10 per cent. for "faults," dykes, and pillars.
Net profit per ton, after allowing for profits tax, say, 10s.
Equipment, 100 stamps and a tube mill, crushing, say, 200,000 tons per annum.

Total tonnage = $200 \times 4 \quad 6160 \times 0{\cdot}8 \quad 3{,}942{,}400$ tons.

"Life" of mine $\frac{3{,}942{,}400}{200{,}000} \quad 19{\cdot}7$; say 20 years.

Profit per annum $200{,}000 \times £0{\cdot}5 \quad £100{,}000.$

Thus the mine will pay £100,000 in dividends for 20 years before becoming exhausted. It will be assumed that the investor is satisfied with 7 per cent. interest, with redemption of capital at 5 per cent. On referring to the table, the factor for 7 per cent. and 5 per cent. for 20 years is found to be 10·59. Then total present value of dividend:

$$100{,}000 \times 10{\cdot}59 = £1{,}059{,}000.$$

If the issued capital of the company be, say, 250,000 shares, each of the shares are then worth £4 4s. 6d. The balance-sheet must be examined, and if the company is in debt, or has debentures in issue, the value of these has to be deducted from the present value, while if it possesses cash in hand this should be added to present value. The value of the equipment and shafts, and also the figure at which the claims themselves stand in the balance-sheet, must be disregarded, as when the reef is exhausted they are worth practically nothing in the majority of cases. It will be readily understood that an estimate worked out on the above lines is a mere approximation, and in some instances too little is known of the possibilities of a mine to enable any estimate to be framed that might be at all reliable. On the other hand, in some mines the probable ore-contents can be foretold within reasonable limits, and in such instance the investor must to a large extent exercise his own judgment. For example: if he makes certain assumptions of which he can be fairly sure, and which in any event will under-rate rather than over-rate the value of the mine, he will be justified in discounting his profit at only 6 per cent.; while in another case, where the speculative element is greater, and a close estimate is impossible, he can to a certain extent counterbalance this extra risk by discounting his profit at 10 per cent.

The particulars given above represent the A B C of mine valuation. It is easy to get far wrong unless great caution is exercised, but an application of these main principles of mine valuation must induce a more business-like and critical attitude of mind in the investor, and should eliminate the spirit of mere gambling. It must be understood that the calculation of

Number of Years' Purchase of Dividend to Yield 6 to 10 per Cent. Income and Redemption of Principal (5 per Cent. Compound Interest).

Years' Life.	*At 5 per cent.*	*At 6 per cent.*	*At 7 per cent.*	*At 8 per cent.*	*At 9 per cent.*	*At 10 per cent.*
1	·95	·94	·93	·93	·92	·91
2	1·86	1·83	1·81	1·78	1·76	1·71
3	2·72	2·67	2·62	2·58	2·53	2·49
4	3·54	3·46	3·39	3·31	3·24	3·17
5	4·33	4·21	4·10	3·99	3·89	3·79
6	5·01	4·92	4·76	4·62	4·49	4·36
7	5·78	5·82	5·40	5·21	5·03	4·87
8	6·46	6·21	5·97	5·75	5·53	5·34
9	7·11	6·80	6·51	6·25	6·00	5·76
10	7·72	7·36	7·02	6·71	6·42	6·14
11	8·30	7·89	7·50	7·14	6·81	6·50
12	8·86	8·38	7·94	7·54	7·16	6·81
13	9·39	8·85	8·36	7·90	7·49	7·10
14	9·90	9·30	8·71	8·24	7·79	7·39
15	10·38	9·71	9·11	8·56	8·06	7·61
16	10·84	10·10	9·45	8·85	8·31	7·82
17	11·27	10·48	9·76	9·12	8·54	8·02
18	11·69	10·83	10·06	9·37	8·76	8·20
19	12·08	11·16	10·33	9·60	8·95	8·37
20	12·46	11·47	10·59	9·82	9·13	8·51
21	12·82	11·76	10·83	10·02	9·29	8·65
22	13·16	12·04	11·06	10·20	9·44	8·77
23	13·49	12·30	11·27	10·37	9·58	8·88
24	13·80	12·55	11·47	10·53	9·71	8·99
25	14·09	12·78	11·65	10·67	9·82	9·08
26	14·37	13·00	11·82	10·81	9·93	9·16
27	14·64	13·21	11·98	10·94	10·03	9·24
28	14·90	13·41	12·14	11·05	10·12	9·31
29	15·14	13·59	12·28	11·16	10·20	9·37
30	15·37	13·76	12·41	11·26	10·27	9·43
31	15·59	13·93	12·53	11·35	10·34	9·48
32	15·80	14·08	12·65	11·43	10·41	9·53
33	16·00	14·23	12·75	11·51	10·46	9·57
34	16·19	14·37	12·85	11·59	10·52	9·61
35	16·37	14·50	12·95	11·65	10·57	9·64
36	16·54	14·62	13·03	11·72	10·61	9·68
37	16·71	14·74	13·12	11·78	10·65	9·71
38	16·87	14·85	13·19	11·83	10·69	9·73
39	17·02	14·95	13·26	11·88	10·73	9·76
40	17·16	15·04	13·33	11·93	10·76	9·78
45	17·77	15·46	13·60	12·11	10·88	9·86
50	18·25	15·76	13·80	12·23	10·96	9·92

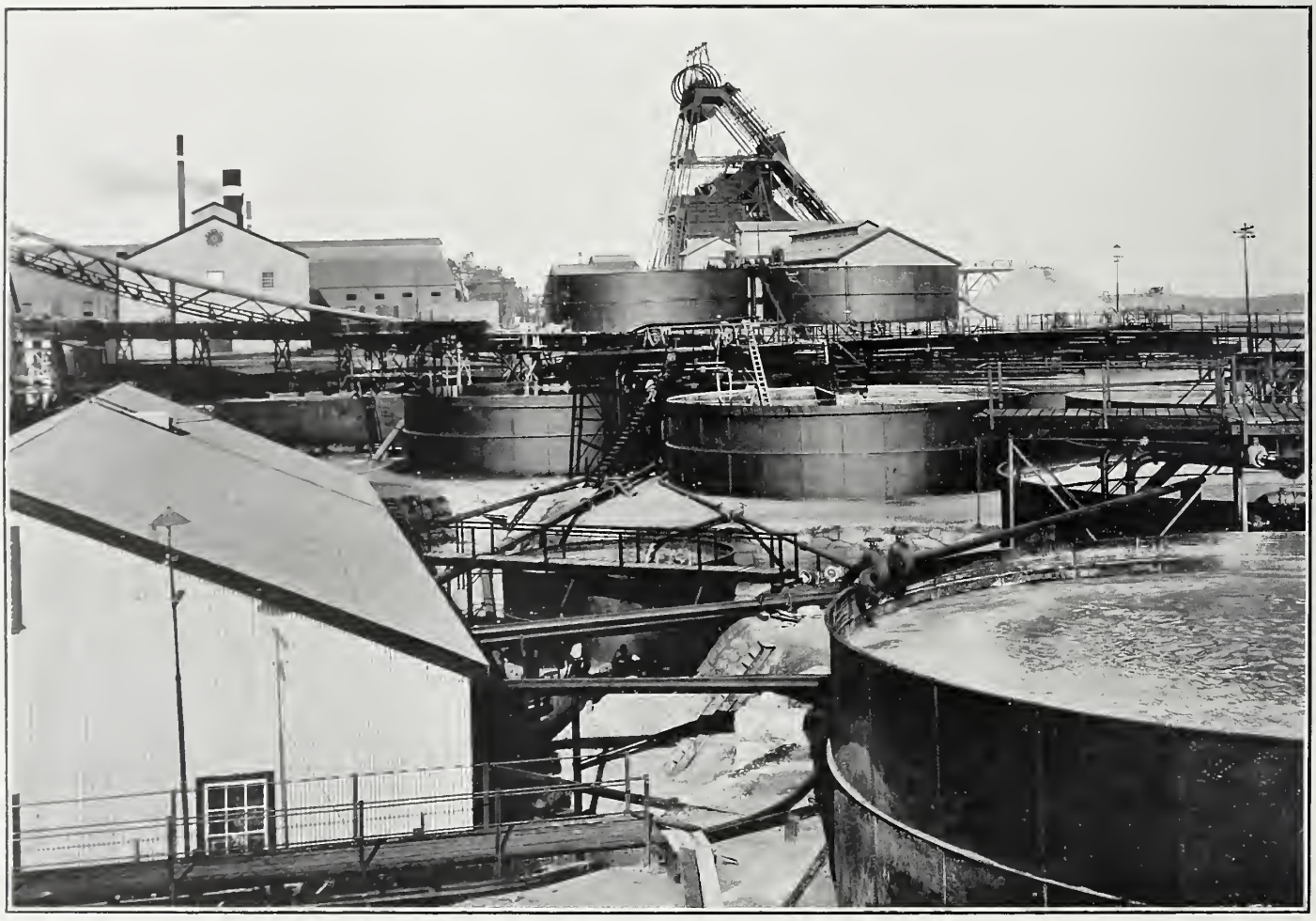
tonnage and grade which has been exampled applies only to mines on the Rand, where the permanency of the reef is such that it is possible approximately to value them before they are actually developed.

(XI.) MINE STORES.

In an industry so large as that of the great Transvaal Goldfield the quantity of stores consumed inevitably assumes very extensive proportions. The amounts expended by the mines of the Rand in stores and coal at the present time reach the huge total of some £7,500,000 yearly. The chief item of outlay in this immense sum is for coal, and it was the main factor in the creation of the industry that the fields are situated on the edge of one of the largest coalfields in the world. The coal resources of the Transvaal have but scarcely been drawn upon, yet the collieries already established in the country are capable of turning out a much greater tonnage of fuel than there is at present demand for. The coal mines nearest to the Rand are now in the Springs district, where the Main Reef Series underlies the coal-measures in many places. (The inferior coal at first worked near Boksburg is either exhausted or the workings have been abandoned.) This fuel is not of high quality, but owing to its proximity to the mines it is largely used. Many of these collieries also are now, however, nearly exhausted. The best Transvaal coal at present in general use comes from the Middelburg district. As a railway line is now being constructed from Brakpan to Witbank, in the Middelburg coal area, the rail freight will in future be less, since the extra cost of haulage by way of Pretoria will be thus avoided. The Vereeniging Estates Collieries, to the south of Johannesburg, where the railway crosses the Vaal River, also supply an appreciable quantity of coal (from beds lying both in the Transvaal and the Orange River Colony), as does, in addition, the South Rand Colliery, near the Vaal River, in the Heidelberg district. Both these ventures are controlled by Messrs. Lewis & Marks. Some 80 miles east of Springs, from Ermelo onwards, the whole country consists of coal-measures, and in many places coal of really good quality is met with.

The average selling price of the coal mined in the Transvaal is under 7s. per ton at the pit mouth, the figures given in the Government Mining Engineer's report for 1905 being 6s. 8·02d. per ton.

The total value of the stores consumed by the mines for the year ending June, 1905, according to the authority above quoted, was £6,866,317. Owing to the large quantities used, and to the keen competition among merchants, the mines procure their requirements at very reasonable prices, considering the great cost of sea and railway freight. The prices paid are naturally much higher than home cost. There does not, however, appear any great likelihood of them being materially reduced under existing conditions—unless, indeed, the



CYANIDE WORKS, ANGELO.

principle of using the railways of South Africa as revenue-producers is abandoned. Greater economy could, at the same time, in some instances be exercised in the use of material, more particularly, perhaps, in such articles as drill steel, large quantities of which are lost underground by careless native and Chinese labourers, overlooked by equally careless white shift-bosses. The vast bulk of the stores bought by the gold companies is purchased through Transvaal merchants, the value of the stores imported direct being less than 5 per cent. of the whole. If the companies imported direct, they would, in addition to

Prospecting for Diamonds on a Farm near Volksrust.

earning the bitter hostility of the community at large, often be faced with heavy losses, by having stock in hand which had become obsolete, while under the present arrangement this risk falls upon the merchants.

It is of interest to compare the amount of money expended upon mine stores with the sums disbursed in wages to the white, coloured, native, and Chinese workers. For the year ending June, 1905, the figures were as follows:—

	£
Stores consumed (total)	6,866,317
Salaries and wages to Europeans ..	5,273,497
Wages to coloured persons ..	2,527,931
Wages to Chinese	345,322

From the above it appears that the amount spent on unskilled labour is not so great as would be assumed, and no very great economies are likely to be possible in this direction. The stores consumed include, however, food for natives and Chinese, which reach upwards of £500,000 every year.

The amount annually expended on explosives for mining purposes is nearly £1,000,000, the price being much lower than it was before the war. All explosives used by the industry are manufactured in South Africa, there being two large factories—one at Modderfontein, some 12 miles to the north-east of Johannesburg, and the other (which belongs to the De Beers Company) in the Cape Colony.

The following table gives the value and percentage of the total stores purchased by the Witwatersrand mining companies for the year ending June 30th, 1905:—

Classification.	*Value.*	*Percentage of total stores.*
	£	
Belting	44,966	·7
Candles	179,548	2·3
Castings	58,447	·9
Cement	100,446	1·5
Chemicals	59,594	·9
Coal	995,278	14·5
Coke	27,669	·4
Cyanide	291,218	4·2
Electric light and power fittings	80,157	1·2
Explosives	872,546	12·8
Fodder for stables ..	33,779	·5
Fuse	56,747	·8
Iron	112,094	1·6
Lime	69,706	1·0
Lubricants	92,127	1·3
Machinery	865,256	12·7
Native foods	367,099	5·4
Chinese foods	201,736	2·9
Pipes and pipe-fittings ..	231,938	3·4
Rails and crossings ..	98,045	1·4
Shoes and dies	68,828	1·0
Steel	165,720	2·4
Timber	485,255	7·1
Trucks	36,278	·5
Wire ropes	57,091	·8
Zinc discs	58,623	·9
Miscellaneous	1,156,106	16·9

(XII.) WAGES OF THE MINE WORKERS.

Owing to the excessive cost of living in the Transvaal, the rate of wages paid in the Rand industry is probably higher than that obtained anywhere else in the world, under conditions of life and general surroundings favourable to the establishment of a normal European community—for no comparison can be possible, from a social point of view, between the magnificent climate of the Transvaal uplands and other parts of the globe where men have to be paid highly to face sickness and other grave risks. It is true that the bare "living" expenses of an unmarried man need not be more than £8 or £9 per month, but the cost of everything outside of actual necessaries is excessive, house rent alone being in most cases exorbitant. At the same time, on the mines employés either get quarters free, or only need to pay a merely nominal sum. The average rate of wages according to the Government Mining Engineer's report for 1905, is as follows:

MINE.	*Average pay per shift.* s.	d.
Shift bosses	24	5
Timbermen	20	5
Pipemen	19	7
Platelayers	19	2
Banksmen and onsetters	15	0
Shovellers and trammers	14	5
Pumpmen	19	0
Mine-samplers	16	2
Drillmen (machine), stoping ..	26	10
Drillmen (machine), developing ..	33	10
Drillmen (hand), stoping	18	7
Drillmen (hand), developing ..	23	3
Engine-drivers, underground ..	16	5
Engine-drivers, surface hauling ..	20	0
Engine-drivers (compressors) ..	19	0
Skipmen	17	9
Apprentices	6	8
Other mine employés not classified	11	1
WORKSHOPS.		
Foremen	24	4
Fitters	20	1
Riggers	20	0
Handymen	14	1
Boilersmiths	20	2
Plumbers	19	7
Shop engine-men	15	5
Monlders	20	2
Painters	18	0
Masons	23	9
Carpenters	20	2
Smiths	20	2
Drill-sharpeners	21	11
Electricians	18	5
Apprentices	7	4
Other workshop hands not classified	16	5
MILL.		
Foremen	22	8
Amalgamators	18	1
,, assistants	12	10
Mill-greasers	10	6
Mill engine-drivers	19	3
Engine-greasers	11	9
Vannermen	15	5
Apprentices	8	0
Other mill hands not classified ..	12	8
CYANIDE WORKS.		
Foremen	21	8
Cyaniders	15	7
Fitters and dischargers	14	0
Apprentices	7	3
Other cyanide hands not classified	11	6

SUNDRY SURFACE MEN.	Average pay per shift. s.	d.
Overseers and crushermen ..	15	0
Trammers	14	11
Diamond drillers	28	0
Weighbridge men	12	2
Pump-station men..	14	7
Firemen	15	0
Police	12	3
Mechanical haulage-drivers ..	15	3
Locomotive engine-drivers ..	19	2
Unskilled labourers	10	7
Other sundry employés not classified	13	9

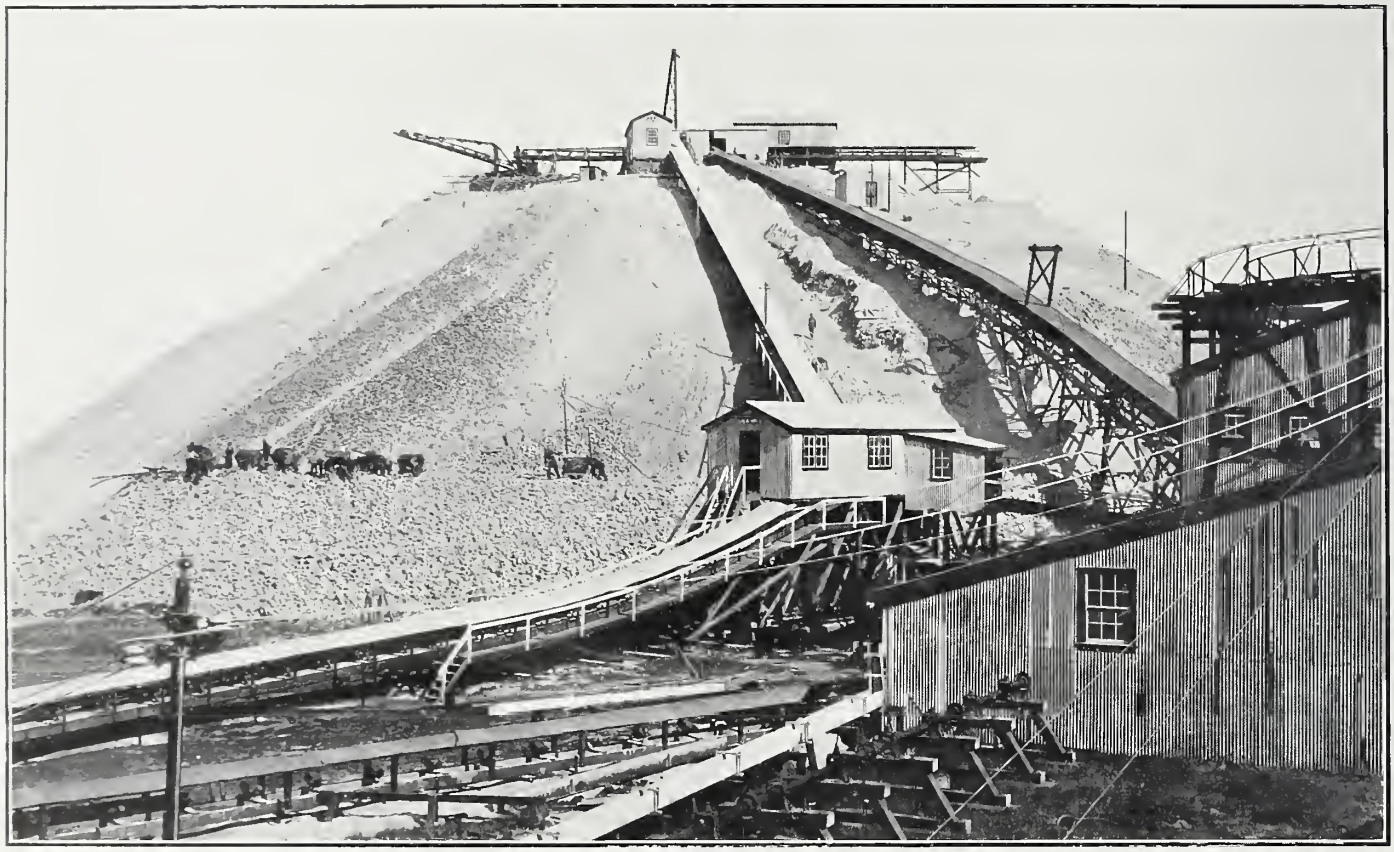
The above shows the average wages paid to some of the hands, exclusive of the salaries of the permanent staff of the mine. The salaries run roughly as follows, the figures here given being rather under than over the average of the rates paid :—

	Monthly Salary. £
Mine managers ..	100
Secretary	40
Surveyor	40
Battery manager ..	45
Cyanide manager	45
Compound manager	35
Engineer	50

The members of staff, in addition to their salary, receive house-rent free, and have nothing to pay for other small items such as electric light and water.

The majority of the mine employés are single men, and have rooms on the mine property, for which they each pay about 10s. per month. Practically every mine has its boarding-house, where the monthly charge is from £6 to £7. A reading and recreation room, with a billiard table, is provided by the company on most mines, for the use of employés, who subscribe towards its upkeep.

In spite of these advantages, it cannot be said that the standard of efficieney of the men employed is high —or perhaps the actual condition of affairs may be better expressed by saying that there is often a notable lack of *esprit de corps*, and of keenness. Many of the men, even in the higher positions, evince but little interest in their work, apparently doing it because it has to be done if the pay is to be drawn, but not that they take any pride in it. This is largely due to the system of centralisation initiated since the war by the controlling houses. This tended to invest all initiative, and eventually all power, in the head office of the group in Johannesburg, and reacted by making the man on the mine purely a machine to carry out instructions given in pursuance of a policy in which he had no part. As human machines the men on the mine perhaps did as much as they were called upon to do, but being machines they never did more. In some of the mines this tendency to do as little as possible reached such a pitch that a state of things bordering almost upon demoralisation ensued, which was plainly shown in the needless increase of the working costs and the inexplicable falling away of the profits of the companies concerned. It has now, however, been generally realised that this centralisation policy is a grave failure, and steps have been already taken to revert to the old system of individual initiative and departmental responsibility, leaving the main details of running the mine upon the resident manager and his immediate lieutenants, the headquarters staff confining their energy more to the enlightenment of the Board of Directors, and the development of a controlling policy. Another reason why the efficiency of the white employés has fallen off may be ascribed in the loss of the large number of good miners who have died of miner's phthisis. These older miners, in most instances born and bred in mining districts, had learnt their calling as boys, and had considerable experience, backed up by invaluable traditions and associations. Their



TAILINGS HEAP, KNIGHTS DEEP.

place has been taken by a class of men who cannot correctly be termed miners at all, and certainly would not be able to pass as such in many of the other larger mining centres of the world, where all-round skill and experience are called for. The experience of the bulk of the local so-called "miners" has been entirely confined to operating rock-drills, or "bossing" (overseeing) hand-drilling by native "boys," and many of them are sadly inefficient at that. As a proof of the low standard of efficiency displayed, it may be explained that the few good men still left can earn £70 or £80 per month, where the vast majority of the miners now employed make little more than £1 a shift (or day's pay), and many of them are not capable of even doing this.

On the surface, the standard of efficieney in workers is higher, and there are many first-class mechanics on the fields. The average work done by the mill and cyanide hands, although an employment calling for no very special training, is also quite up to the mark.

Native Labour.

The question of native labour as applied to the gold-mining industry is one that has been so little understood by either the "leaders of the industry" or the general community, so persistently discussed by the uninformed, and so wrangled over in the political arena, that it must now be classed as one of those exceedingly contentious subjects hardly possible to treat in an academic spirit. Such impartial treatment of it as is possible is given in a separate chapter. The native employed on the Witwatersrand mines is now better housed and better fed than ever before, and considering his requirements, domestic customs, and social limitations, he may be said to be the best-paid labourer in the whole world. The majority of the native unskilled labourers working about the mines are employed underground as hammer-boys, in shovelling ore down the stopes, and in tramming in the levels. As a hammer-boy the aboriginal is capable of doing far more than he ever does. The standard on the fields makes a 3 ft. hole constitute a day's work; but, as this amount of work can be accomplished by most of the boys in the space of three hours, it follows that they are capable of far more if they wished. It is a difficult matter, however, to break down an established custom, and offers of additional pay have not been a sufficient inducement to the vast majority of the native labourers to do more than they have been in the habit of doing in the past. Most of the mine natives come from Portuguese East Africa, and sign on for a period of twelve months. The next largest proportion is drawn from the Northern Transvaal. The other portions of South Africa do not send many boys to the Rand.

Chinese Labour.

An economic experiment that has been confused by clouds of misrepresentation, hampered by official interference, and dragged up and down the sordid arena of party politics, is virtually tabooed as a subject of impartial description. It must suffice here to state that the Chinese coolie has perhaps hardly proved so economical as the native labourer, but this is in a measure due to the unreasonable restrictions imposed by the Chinese Importation Ordinance. The Chinese require more supervision than natives, and are more fond of "loafing." They are, however, superior in intelligence, and on this account are much preferred to natives, for some kinds of work, by the miners. If the Chinese are allowed to renew their term of service after their first three years, they will probably prove cheaper as a labour supply than natives, as their cost of importation will have been paid for.

Outlying Mining Districts.

Gold—Banket, Quartz, and Alluvial.

Although the output of the largest "banket" propositions, such as the Simmer & Jack, or the Robinson, is at the present time considerably larger than the outputs of all the gold mines in the Transvaal (outside of the premier goldfield of the world) put together, it has not to be forgotten that gold was won in the Lydenburg and Marabastad districts about 14 years previous, and in the Kaap Valley some five years previous to the discovery of the conglomerates of the Witwatersrand area as payable gold-carriers. At the same time that numbers of mining men from Kimberley and a few from Barberton were following up the lead set them by the brothers Struben (the pioneers of the Witwatersrand, 1884), and were securing holdings along the outcrop of the little-understood conglomerate beds, some of the most able prospectors in South Africa were making most promising discoveries on the Murchison Range and in other parts of the Zoutpansberg district, while the Sheba Mine was crushing 4 oz. quartz in the Kaap Valley, and mounting by leaps and bounds to a prominent position amongst the notable gold mines of the world. Gradually, however, the unique formation and economical conditions and the remarkable extent of the banket gold-carriers concentrated the attention of the mining world upon the Witwatersrand proper, and captured the benignant breezes from the outside mining districts, much as the stately East Indiaman might take the wind out of the sails of her humbler sisters in the convoy. There are other causes besides the unique and favourable conditions on the Rand that have brought about the eclipse, sometimes partial, sometimes complete, of the "outside" mining areas. Chief among these is the weakness of the policy in the past of providing working capital in (as a rule) totally insufficient quantity, leading to the suicidal attempt to place a property on a "crushing" basis before it was known to have sufficient ore in hand to pay for its exploitation and return some sort of a dividend, however humble. It was only on the Rand that the necessity came to be early recognised for a mine to pass through a development stage, and even there the lesson was learnt but slowly and painfully. In the early days, a holding would be acquired, a mill built, and crushing commenced upon the ore exposed by a single open cut, or adit-level, or shaft. Soon the pay-chute would be exhausted, a poor zone met with, and the shareholders would wake up to the disconcerting position of no funds being available to perform the "dead work" invariably attendant upon the opening up of a mine, especially of a quartz proposition. Hence re-construction, or liquidation, pessimism, questionable financial efforts in "throwing good money after bad," the discredit of the district, and suspicion directed against the industry at large. To-day there are numerous properties in the quartz-mining areas that appear, not only financially, but also as regards intrinsic work, to be entire failures, merely because speculators preferred to waste one sovereign rather than spend three upon work that could reasonably be expected to return—with a profit—all the money put into it. What is true of the quartz-mining areas is hardly less true of the outside "banket" districts, where the conditions of irregular mineralisation and complicated "faulting" of the conglomerate beds create a parallel absent in the unique conditions obtaining within twenty miles east and west of Johannesburg. In September, 1906, only some ten properties worth considering were contributing to the gold output of the Transvaal. Of the ten, but three were on the basis of dividend-paying. In addition to these a certain number of smaller ventures were working intermittently in various parts of the Colony. The returns for the month mentioned showed that the ten mines indicated treated some 34,700 tons of ore with the equivalent of 360 stamps at work, yielding gold to the value of some £75,000.

It is proposed in this article to deal with the outlying mining districts in the following order:—(1) The Heidelberg region; (2) the Klerksdorp region (both of these being distinguished by conglomerate propositions); (3) the Barberton region; (4) the Lydenburg-Pilgrim's Rest region; (5) the Zoutpansberg district; (6) the Ottoshoop region, and other districts. Some reference will be made also to alluvial mining.

The Heidelberg Region.

The principal mine in the Heidelberg district is the Nigel, situated about nine miles north-east of the town of Heidelberg, and twenty miles south-east of Johannesburg. The identity of the conglomerate bed worked as the Nigel Reef has long been a fruitful theme for argument amongst local geologists, but in the light of recent information gained at the mine itself, and from adjacent boreholes, it seems safe to correlate the gold-carrying body with the Main Reef Series. The first returns of the Company, which was formed in Natal in 1888, were exceptionally good, the grade of ore milled being worth about 150s. per ton. The Company, however, soon exhausted the very rich patches easily accessible in the mine. At the same time, the Nigel Reef is throughout of exceptionally high grade. The property consists of 626 claims, and keeps 55 stamps at work. The claims actually containing the reef number 532, and up to the end of June, 1906, the Nigel Reef had been worked out in 45 of these. Owing to the extremely flat inclination of the ore-body, development has to be effected through a number of shafts. The reef is thin, consequently working charges are comparatively high; at present they amount to about 27s. 6d. per ton milled. The ore is being exhausted at the rate of some 7,850 tons per month, with an average yield of rather over 3,800 oz. monthly. During the year expiring in June, 1906, the Nigel Company obtained a yield of £197,411, and made a profit of £78,421. The Directors of the Company are now considering the advisability of adding to the crushing and recovery plants. About a quarter of a million tons of ore, of the average value of 9 dwts. per ton, are developed. The Consolidated Goldfields of South Africa hold a large area of claims on the dip of the Nigel Gold-mining Company's area. Three concerns own this ground—the Nigel Deep, the Sub-Nigel, and the Central Nigel Deep. The most important of these is the Nigel Deep,

with a 30-stamp mill in operation. Owing to acute scarcity of native labour this Company has of late secured but indifferent results; still, there can be no doubt as to the payability of the property under more normal economic conditions. Nothing is at present being done on either the Sub-Nigel or the Central Nigel Deep, although a good deal of development and drilling work has been undertaken on both properties, with satisfactory results. Numerous other ventures—amongst them the Salmon Nigel, Ryan Nigel, Transvaal Nigel, East Nigel, West Nigel, and Ellen Syndicate—have from time to time been launched to exploit ground in the vicinity of the principal mine, but at the present time they all are idle. Like the Du Preez Reef, the Nigel Reef is an erratic gold-carrier, and efforts for its location have always been attended with scant success. The strike and dip of the reef outside the Nigel and Nigel Deep areas are very imperfectly understood, and considerable sums of money have been spent in shafts and boreholes with absolutely inconclusive results.

In 1902 the discovery of important gold-bearing reefs was announced by the Coronation Syndicate, which had acquired a number of farms lying to the east and south-east of the town of Heidelberg, contiguous to the Natal railway line. Development work gave at the start most encouraging results. A number of shafts and boreholes were commenced. The evidence obtained from them induced those in control to correlate the Coronation Reef with the Main Reef Series, and the shares advanced to a very high premium. Gradually, however, one working after another was abandoned, and operations came to be confined to the farms Rietfontein and Rietbult. The main workings of the syndicate (on Rietfontein) were known as the Edenkop Mine. The upper levels here gave excellent results. The reef exploited was of very high grade, although thin and "faulted." As a greater depth was attained the "faulting" became more and more troublesome, and, after repeated efforts to locate in depth the rich reefs found near the surface, operations were suspended. The syndicate also prospected farms lying to the south and south-west of Heidelberg. It appears that in this district a number of anticlines and synclines occur. It is the main north-eastern limb of the major syncline that is worked by the Coronation Syndicate on Rietfontein, Uitkyk, and Rietbult, and the south-western limb has been exploited on Modderfontein, Wilgepoort, Tweefontein, and Daspoort.

The results secured by the Coronation Syndicate in the early stages of its career led to the flotation of numerous syndicates and companies formed for the purpose of testing the Reefs on either side of the anticline, but the fall of the premier concern has meant the collapse of these excrescences. The Edenkop Mine is now being worked by tributors who have erected a 10-stamp mill, and are doing well.

Near the township of Greylingstad are the Heidelberg-Roodepoort and Hex River mines. The former is owned by the Barnatos. Crushing with 40 stamps some years ago, the Company worked at a loss. It now appears very doubtful whether the venture will ever be resuscitated. The Hex River Company had been developing a thin reef for some years, but the results were so inconclusive that no statement can be ventured upon as to the value of the proposition. The property is situated in a more or less discredited locality, although the reefs in the Hex River mine itself are by no means as "faulted" as is usual in the district.

The principal ventures formed to exploit gold to the south-west of the Nigel at about the time of the Coronation "boomlet" were the Federation, the Coronation Freehold, the Coronation Victory, the Coronation Extension, the New Colonies, the Houtpoort, and the Daspoort Main Reef companies. These syndicates and companies spent considerable sums of money in boring for the reef worked by the Coronation Syndicate. They did not, however, meet with success, and the properties are now closed down, the syndicates and companies themselves being virtually defunct. In the light of recent experience, the theory that the Coronation Reef is identical with the Main Reef appears untenable, not to say unjustifiable. Be that as it may, the faith at one time reposed in the district has been abandoned, and—with the exception of the mines in the immediate vicinity of the Nigel—the Heidelberg district generally is now in distinctly ill repute.

One other property calling for mention in this region is the Molyneux Mines, situated a few miles north-west of Edenkop. This area was worked in the early nineties, and about a year ago the mine was re-opened. A 20-stamp mill was installed, but the property was soon closed down again, and has since been idle. The reefs worked were very "faulted," and the gold values erratic—which brief sentence seems destined to prove the epitaph of the whole of this section, at least, of the Heidelberg Goldfields.

The report of the Commissioner of Mines for 1905 gives two producing mines (the Nigel and the Nigel Deep) in the Heidelberg district dropping an average of 50 stamps daily for 337 days in the year, crushing a total of 71,449 tons, and producing gold of a total value of £166,130. The Chamber of Mines annual report for 1905 names three mines as having stamps erected in the district—the Nigel, with 50 stamps (each weighing 1,150 lbs.), with a daily duty of 4·37 tons per stamp; the Nigel Deep, with 30 stamps (each 1,133 lbs.), with a daily duty of 4·92 tons per stamp; and the Nigel Proprietary, with 10 stamps (each 750 lbs.), not working.

The Klerksdorp Region.

About 120 miles distant by rail to the south-west of Johannesburg lies the town of Klerksdorp. Between Klerksdorp and Potchefstroom, to the north-west, occur long outcrops of parallel reefs, which are undoubtedly members of the Witwatersrand formation, but which cannot, in the light of present knowledge, be definitely assigned to any fixed horizon in the Rand System. Here and there these beds have been developed to a certain extent. Generally speaking, the reefs of the Klerksdorp district appear to be much "faulted," and of insignificant gold value. From time to time Klerksdorp has produced considerable quantities of gold, but in September, 1906, there was only one property yielding an output. This is the Elandslaagte Mine, where the treatment of accumulated slimes has been proceeding for some time. The property is equipped with 20 stamps, and in the early nineties the Company met with a certain amount of success owing to very economical working. The Klerksdorp Gold and Diamond Company, the Niekerk, the West Bonanza, and the Buffelsdoorn mines have all produced gold subsequent to the war, but are now in the throes of re-construction. The Klerksdorp Gold and Diamond Company, operating with a dry crushing and direct cyaniding plant, was not a successful venture. The property, since the dry-crushing plant was abandoned as a failure, has procured a stamp battery; with this, however, poor results have been attained, and the concern is now shut down, pending

a scheme of re-construction and extended development. The lack of adequate development underground has probably always had much to do with the Company's indifferent record. At the Niekerk, also, the reputation of the Klerksdorp district has been damaged by premature crushing. The development of the mine is now being strenuously pushed forward.

Two or three years ago the results secured by a prospector working on English's Kopje, a few miles from Klerksdorp, attracted attention. The prospector worked in a very crude manner. The ore was hoisted by means of oxen, and was treated, after very rough crushing, by direct cyaniding. Despite the adoption of these primitive methods, very good results were attained, and the property was floated under the title of the West Bonanza Gold-mining Company, Ltd. Development work was carried out, and a 20-stamp mill and cyanide plant erected. Difficulty was, however, experienced in financing the proposition, and it has lately been arranged to lease the venture to a tributing syndicate.

The West Bonanza development brought about the flotation of numerous syndicates to explore ground in the vicinity, whilst attention was directed to the abandoned ventures of the district; but the attention of the public was soon diverted. Early in 1905 interest was again centred on the Klerksdorp district owing to reported satisfactory development on Rhenoster Sprnit. This property had been worked in the early nineties by the firm of Neumann & Co., and it was stated that they had not developed the reefs to the best advantage. At any rate, a company with strong financial support, styled the Rhenoster Mines, Ltd., was floated, and the usual swarm of ephemeral ventures was hatched—such as the Southern Rhenoster, the Western Gold Fields, the Klerksdorp Gold Farms, and several others. It was, however, soon demonstrated that the value of the Rhenoster property had been greatly over-estimated. Development work carried out upon the larger property gave most disappointing results, while the operations of the adjoining properties were productive of nothing that could be taken to justify the continuance of operations. About this time the Coronation Syndicate, and others, acquired the Afrikander property, which had been worked in a desultory manner previous to the war, with a dry-crushing plant in operation. Development had been sadly neglected, and the mine had struggled on in a hand-to-mouth manner. More recently, since the flotation of the property into the Afrikander Proprietary Mines, with a capital of £200,000, over 100,000 tons of ore, of an average essay value of 12½ dwts. per ton, have been blocked out. It is purposed to erect a 60-stamp plant.

MINING—KLERKSDORP.

The Rietkuil Gold Mines, controlled by the Neumann firm, owning 165 claims, adjoining the Afrikander area, is a venture that has lain idle since 1896. Other properties which drew a measure of attention in the nineties, but which have since sunk into disfavour, are the Eastleigh, the Eastleigh Deep, the Westleigh, and the new Ariston Mines. The latter property is being re-opened, and there is talk of at least one other of these ventures—originally formed to work what is regarded as Black Reef ore-bodies—being taken over by tributors.

To the north-east of Klerksdorp, and close to the railway line connecting with Johannesburg, are the Buffelsdoorn properties, controlled by the Barnato "group." The Buffelsdoorn Estate, the principal mine here, has so far yielded ore of unpayable value. Recently attention has been directed to the treatment of accumulated slimes, and from these alone fair profits have been made. The Company has been three times re-constructed. It now has an issued capital of £550,000, owns about 30,000 acres of ground, and possesses a large (and idle) equipment of 170 stamps with adequate cyanide plant.

Included conventionally in the Klerksdorp district are the quartz-mining propositions of the Schweizer-Reneke region. In January, 1904, the New Gold Venture Syndicate was formed, by the Farrar and Anglo-French groups, together with certain Kimberley mining men, to exploit the farms Abelskop and Goudplaats, in the Bloemhof district, near Schweizer-Reneke, and distant 120 miles from Klerksdorp in a south-westerly direction. On these two areas there is a promising occurrence of gold in ferruginous slates and shales—a formation sufficiently interesting and rare to merit more detailed description. The gold is found in a striped and contorted rock, consisting of ferruginous banded chert and quartzite schist ("calico rock"), which is associated with chloritic schist. The mineralisation appears to be most pronounced when the rock is most plicated, the numerous rents produced by the folding having been favourable for the deposition of secondary quartz. The whole formation is highly tilted, and lies between granite outcrops. For upwards of two years development work has been proceeding here, and the discovery of bodies of ore of most satisfactory value is from time to time reported. According to the report for the year ending May 31st, 1906, 33,400 tons of ore, of an average assay value of 8·1 dwts. per ton, have been exposed. After more development work has been done it is intended to erect a crushing plant of 40 stamps capacity. With this end in view the consulting engineers of the syndicate are now engaged in carrying out experiments in order to determine the best means of treating this peculiar ore. Close to the properties of the New Gold Venture Syndicate are the Botmansrust properties—Block A and Block B. The ore here is similar in nature to that worked on Abelskop and Goudplaats. A fair amount of development work has been done, and reefs of good value have been exposed. Pending developments on the New Gold Venture ground, and owing to the general depression now prevalent, no work of consequence is at present being carried on. The opening of the Klerksdorp-Fourteen Streams railway line has much improved the economic position of the mines near Schweizer-Reneke.

The report of the Commissioner of Mines for 1905 shows that for the official year dealt with only 17 stamps were at work in the Klerksdorp district during 119 days, treating 8,988 tons, and producing gold of the value of £33,232. The Chamber of Mines annual report for 1905, together with the Mines Department returns, indicate that the following properties in the district have a crushing equipment:—Buffelsdoorn Estates, 170 stamps; Eastleigh, 60 stamps; Elandslaagte, 20 stamps. The Klerksdorp Gold and Diamond mine had a dry crushing plant equivalent to 40 stamps; the New Ariston has 15 stamps, the Niekerk 10 stamps, and the West Bonanza 10 stamps; while both the Middelvlei Estates (West Rand) and the Monte Christo property were producers during the financial year.*

The Barberton Region.

The mining district of which Barberton—a town lying some 330 miles by rail to the east of Johannesburg—is the centre possesses many diverse geological, geographical, climatic, and economic conditions, and when fully developed is destined to consist of several entirely distinct mining areas. In its eastern portion this region contains the geological horizon represented by the Potchefstroom System, and affords well-marked and typical developments of the Black Reef Series, the Dolomites, and the Pretoria-Lydenburg series of shales and quartzites—these almost horizontal beds lying unconformably upon the tilted Swaziland Schists, intrusive old granite, and interbedded quartzites and highly crystalline talcose and chloritic schists of the Barberton Series (all of the Archæan System). The flat formation traverses the Duivels Kantoor and Kaapsche Hoop areas and the farms of Barrett's Berlin and Coetzeestroom, which together occupy what is known as the Godwaan Plateau. It was the gold shed from the mineralised portions of the Dolomites that first, in 1881, attracted an alluvial-mining population to this region, and led to the establishment of "reef" mining proper. The De Kaap Goldfield consists, strictly speaking, of the granite "boss" which lies between the escarpment of the Kaapsche Hoop area and the town of Barberton with the adjacent mining area owned by Moodies Co., together with the surrounding belts of tilted Swaziland schists and Barberton formation, which stretch uninterruptedly eastwards until lost near Komati Poort under the geologically recent (and almost horizontal) beds of the Upper Karroo Series. Separated from the Barberton area by the range of the Makonjwa mountains — a massive development of the quartzites and conglomerates of the Barberton Series — lies the Steynsdorp Goldfield, intersected by the Komati River, and contiguous to the mineralised Swaziland schists of the Forbes and other concessions in Swaziland and the tinfields of Oshock and Bettws-y-coed. The De Kaap region was a mining centre of some importance before gold was even thought of as existing on the Witwatersrand. For some years the Barberton district possessed the leading gold-producer of the African continent in the noted Sheba Mine (at that time crushing 4 oz. rock), but this property has in recent years fallen on less prosperous times, and the industrial position of the whole region has suffered in sympathy. Speaking generally, the gold now being won is contained in the interbedded quartzites and talcose and chloritic schists, as well as in lenses of quartzose matter, in true fissure veins, in the dolomite beds of the Godwaan Plateau, in surface fissures produced by intrusions of igneous rock, and in alluvial deposits. It is from the interbedded quartzites and schists that the Sheba Mine has since 1887 produced about three millions sterling in gold, and has distributed over £700,000 in dividends. The Company holds 397 claims, of which only a few have been opened up. The capital of the Company is large, and is further encumbered by a debenture issue. The crushing equipment consists of 200 stamps, but it has been impracticable ever to run more than 120 of these at one time. Adequate cyanide plant is erected. Altogether the Sheba is an unwieldy sort of property. To use a digger's colloquialism, the Company represents a very fair example of "biting off more than it is comfortable to chew." The gold occurs in what are known as "chutes" or zones of enrichment in the main body of interbedded quartzite. It seems pretty evident that the

* The Middelvlei Estates and the Monte Christo are West Rand properties, but for administrative convenience are included in the Klerksdorp district.

Sheba Company has worked out the richest known "chute" of the property. Since the war the grade of ore has fallen off considerably, and during the concern's recent history the value of the gold recovered has barely exceeded the expense of winning it. Quite lately, however, returns have improved somewhat. It is "on the cards" that the Sheba Company may at any time make a new discovery which will wholly change the position at the mine; nevertheless, in the opinion of those most familiar with the property, the Sheba has seen its best days.

Outside of the Sheba property, the very long list of mining undertakings in the Barberton district furnished, in September, 1906, only two gold-producers—the Worcester Exploration and Gold-mining Company's mine, and the Barrett's Berlin workings. The Worcester Mine has a holding of 157 claims situated some 16 miles to the north of Barberton, the nearest railway station being that of the North Kaap. Gold-production has been going on with the new equipment (which is on a 40-stamp basis) since August, 1904, the monthly tonnage fluctuating between some 2,600 tons and over 5,000 tons. The working costs are understood to be a little under 20s. per ton, and to leave a satisfactory margin for profit. Power is supplied by a turbine on the Kaap River. There is more than one gold-bearing lode on the property; that being wrought is a quartz between well-defined walls of talcose schist, and has a dip of 80° to the north. The Worcester Exploration property may be looked upon as an established steady producer for some years to come. At no great distance from it lies the Clutha Mine, situated upon a hill some 900 ft. above its reduction works (which are on a 30-stamp basis) on the South Kaap River. In easier financial times, and with reasonably plentiful unskilled labour, this proposition will doubtless be a profitable undertaking. The Farrar "group" is interested in it, but after a period of active exploitation the venture has relapsed virtually into idleness.

Overlooking the properties above described, and lying high up on the Sheba Hill, is the holding of the United Reefs (Sheba), Ltd., which has amalgamated the old Thomas Reef and the Joe's Luck Reef. The claims number 58, and the reduction plant is being increased from a 15-stamp to a 30-stamp basis. Development is proceeding now that progress has been made with a scheme of re-construction. Under the very efficient control of the present manager this undertaking, if supported financially in an adequate manner by the London Board, would assuredly return satisfactory and regular profits. Among the properties in this vicinity that have unproductive equipments may be noted the Albion (20 stamps), the Elephants Kloof (10 stamps), the North Sheba (5 stamps), the Royal Sheba (20 stamps), the Thistle Consolidated (15 stamps), the Woodstock (30 stamps), and the Worcester (not to be confounded with the Worcester Exploration) with 50 stamps. A Swaziland concern, the Pigg's Peak Development Company, has taken up a property (formerly the Eagle's Nest) situated some five miles from Avoca station—mid-way between Kaapmuiden junction on the Delagoa Bay line, and Barberton—which it is reported to have opened up satisfactorily of late. The property is one that can be worked at a very low rate of expenditure. From January, 1898, to September, 1899, the amount of ore crushed was 57,700 tons, for an output of £49,000, of which £12,000 was profit.

At a very considerable distance eastwards are situated the Adamanda and Three Sisters mines, on a group of high hills overlooking Louw's Creek. From the Adamanda during its first eleven years of existence over 3,000 oz. of gold were won from not more than 2,500 tons with a very poor percentage of extraction, and from the Three Sisters some 7,400 tons were made to yield over 4,400 oz. of gold, under equally unsatisfactory conditions. The properties are now amalgamated, and supplied with capital from a Johannesburg source. Development is well ahead, and a new 50-stamp mill is rapidly nearing completion. The prospects of this venture are excellent.

On Moodies Goldfields, west of the town of Barberton, are a number of partially developed and partially equipped, but wholly idle, ventures, paying rent and royalty to the Moodies Gold-mining and Exploration Company (a Pietermaritzburg concern owning a block of 79,660 acres under mineral "concession" title). In the long list of small holdings located on this concession, it is only needful to mention those that possess reduction plants, of which perhaps the most prominent is the United Ivy Mine (with 20 stamps). Others are the Cuadro Consolidated (10 stamps), Moodies Fortuna (13 stamps), Mount Morgan (20 stamps), Pioneer (10 stamps), and Woodbine (20 stamps).

The third and last of the three steady producers of the Barberton Mining district is that extremely interesting proposition, the Barrett Gold-mining Company's workings on the farm Berlin, on the Godwaan Plateau (Kaapsche Hoop). This little mine occupies the proud position of being the most cheaply-worked gold proposition in South Africa. The ore consists of an exceedingly friable quartzose deposit in the lower horizon of the Dolomite Series, which is worked open-east throughout, is crushed (only where necessary) by a pug-mill, and subjected to the direct cyanide treatment. The mountainous nature of the locality and the abundance of well-utilised water power render possible exceedingly low working costs, which are equivalent to a little less than 3 dwts. per ton. The returns for August, 1906, show that £2,362 worth of gold was recovered from 2,922 tons treated. The same class of ore runs into the adjoining farm, Coetzeenstroom, but has never been profitably exploited. On Coetzeestroom, and on the adjacent Government ground of the Kaapsche Hoop, the Black Reef series of conglomerates is very highly developed in the bold escarpment of the Godwaan Plateau overlooking the Kaap Valley. These conglomerates are known to contain zones of very considerable richness, but the irregularity of the zones and unfavourable financial and economic conditions have stood in the way of any really adequate development of their latent possibilities.

The Steynsdorp and Komati River districts, and other mineralised areas of the Barberton region, at present undeservedly abandoned to complete neglect, do not call for detailed description.

The Lydenburg Region.

The mining district of Lydenburg is now, and presumably will for some little time continue to be, the next in importance to the Witwatersrand area as regards gold output. Its production in August, 1906, was some £26,263 worth of gold, as against £25,060 from the Heidelberg district, £23,231 from the Barberton district, and £7,595 from the Klerksdorp district. Although the Marabastad area is, strictly speaking, senior to Lydenburg as a mining ground, that position virtually belongs to the latter, for, from the date of the discovery, in 1872, of the gold-bearing surface gravels at the headwaters of the Sabi and Blyde rivers, the attention of the early mining community

of the Transvaal was concentrated in the vicinity of Pilgrim's Rest. The arbitrary monopolies granted in 1882 by President Kruger "over the heads" of the alluvial diggers at work on their claims forced the miners to abandon their property for the benefit of men who had in no way contributed to the welfare and prosperity of the State, and led them to try their luck in other districts. From that time onwards the "individual digger" has been practically handicapped out of existence in this field, that fulfils so notably the conditions congenial to him; and the few mining concerns that are to-day in active operation are either the direct heirs of the original concessions, or have evolved under the conditions first brought about by the Gold Law of 1884. The geology of the better-known gold-bearing portions of the Lydenburg district embraces chiefly the almost flat beds of the Potchefstroom System lying upon the tilted strata of the Swaziland Series and the Old Granite. The country is exceedingly rugged, and owing to extensive denudation the stratification is exposed in numerous hills and gorges. The gold-bearing bodies are almost invariably of interstratified quartz—tilted in the schistose formation, and practically horizontal in the rocks of the Black Reef, of the Dolomite, and of the Pretoria (or Lydenburg) Series. It is amongst the rocks of the Potchefstroom System that the chief gold-producers are at work. The Black Reef series is strongly developed in parts of this district, running up to 1,800 ft. in thickness. It includes but few known gold-carriers—the Sunlight Reef, and a thin, rich, and very patchy leader being the only exceptions worthy of mention. The dolomites, too, are irregularly developed, attaining in spots a thickness of some 3,000 ft. In the lowest horizon occur, at Spitzkop, a formation very similar to the Barrett's Berlin Reef (Kaapsche Hoop), which is in the Tweefontein Reef horizon. Glynn's Lydenburg Reef is also found towards the base of the dolomites. The gold is present in irregular zones in a horizontally interbedded body of quartz. The most important ore-body in the district is the Theta Reef, which lies below a characteristic breccia-conglomerate near the uppermost members of the dolomites. This reef—also a horizontally interbedded quartz body—can be traced for many miles north and south of the points where the Transvaal Gold Mining Estates are working it at Pilgrim's Rest. The Chi Reef, another similar ore-body of great commercial value, lies some 200 ft. below the Theta Reef. The overlying Pretoria-Lydenburg series of shales and quartzites also carries payable gold ore in places. The bedded vein of auriferous quartz, called Bewitt's Reef, is situated near the base of the Pretoria Series in the neighbourhood of the farm Frankfort. In a somewhat higher horizon, amongst the beds corresponding with the Pretoria slates, the Nooitgedacht Reef has been intermittently worked at a profit. The Doornhoek Syndicate and the Lochart's Syndicate have worked a rich narrow reef in the sandstones lying several hundred feet above the horizon of the Nooitgedacht Reef.

The Lydenburg Goldfields have suffered from persistent neglect for two chief reasons—which are, that the ground is much "locked up" by large companies and those that have succeeded to the original "concessionnaires," and that even under present conditions the area is comparatively inaccessible, and transport is difficult. The two bigger producing mines, the Transvaal Gold-mining Estates and Glynn's Lydenburg, are in the control of the Eckstein "group." Mining in this flat formation is carried on by driving tunnels into the sides of the hills. The ore is easily broken and crushed, and water is often obtainable in sufficient quantity to generate electricity, and so cheapen the cost of working. Although the district is so hampered by lack of transport facilities, working costs, owing to these favourable factors, are low. In spite of these mines being situated in the heart of a thickly-populated native district, "boys" are by no means plentiful. Indeed, insufficiency of labour has greatly hindered the development of this promising field. If cheap native labour were obtainable in larger quantities, and the district were linked up with the main Central South African Railways system, there can be no doubt that Lydenburg would forge ahead rapidly. The most important undertaking in the district is the Transvaal Gold-mining Estates, Ltd., at Pilgrim's Rest (about 22½ miles north-east of Lydenburg), which controls about 200,000 acres of ground, including 779 mining claims, water rights, etc. The Company's properties have been opened up at several places, and several mines contribute ore to the 80-stamp battery. A feature of recent work has been the very satisfactory developments that have been obtained on the Theta Reef in several of the different workings. During the five months ended with August, 1906, the Transvaal and Gold-mining Estates Company crushed 43,870 tons of ore for a return of £83,932, of which £23,857 was profit. Working costs during this period were therefore at the rate of 27s. 5d. per ton. The Company lets out some of its properties to tributors.

Glynn's Lydenburg is the only outside gold mine of the Transvaal that has of recent years been a consistent dividend-payer. Up to the time of writing the Company had distributed 115 per cent. amongst shareholders. It owns the freehold of the farm Grootfontein, 6,422 acres in extent, including 807 mining claims, five stands, and two water rights. The property is equipped with 20 stamps. For some time the advisability of increasing this crushing equipment has been under consideration, but native labour has been so scarce that it has been impossible to carry out the necessary amount of development work. Although the mill is a small one, and the manager has often to be content with less than ten natives per stamp, the property is worked cheaply. During the last year of the Company's operations, gold to the value of £69,858 (or 53s. 4½d. per ton) was produced. Working expenses came to 17s. 7d. per ton, leaving a profit per ton milled of 36s. 1½d. The total profit for the year was nearly £48,000.

The Glynn's Extension Syndicate has recently been working some ground adjoining Glynn's Lydenburg. A 10-stamp mill has been running, and a return of about £2,000 per month has been secured.

Another concern in the Lydenburg district that has produced a certain amount of gold is the Lisbon-Berlyn. This property has, however, so far not proved a success. Re-construction of the Company is pending.

Numerous other concerns have been floated to exploit properties in the Lydenburg district, including the Lydenburg Gold Farms, Lydenburg Minerals, Lydenburg Land and Exploration, and Lydenburg Gold Exploration companies. Although some of these have been in existence for years, no serious attempt has been made to prove the properties held, owing to the generally adverse conditions.

The Transvaal Chamber of Mines returns gives the following additional properties in the Lydenburg district as possessing a crushing plant:—Belvidere, 5 stamps; Buffels Kloof, 5 stamps; Emanuelson (tributor), 5 stamps; Lochart's, 5 stamps; Nooitgedacht, 30 stamps; Rietfontein

Syndicate, 5 stamps: Spitzkop, 10 stamps: Stiebel, 5 stamps: Waterval, 5 stamps.

Although extensive tracts of gold-bearing alluvial gravels exist in this region, no return of gold of any consequence from this source is now being made.

The Zoutpansberg Region (or "Northern Goldfields").

The term loosely applied to describe the huge section of the Transvaal which includes the Zoutpansberg region means little to the miner who has traversed it, and can convey only inaccurate ideas to those who have no personal knowledge of its resources. Mr. Klimke, late State Mining Engineer to the South African Republic, stated in a report upon this region: "I confirm the opinion that the Zoutpansberg Goldfield is the most extensive in the land." It is known to-day that the region contains some of the most highly-mineralised areas in South Africa, which will probably compare favourably with many of the most highly-mineralised areas in the world. Its distinguishing geological feature is without doubt the extensive (and sometimes peculiar) development of the gneissose and schistose formation of the Archæan System, with its accompanying granites; indeed, one authority has claimed that along the northern boundary of the Zoutpansberg (the Limpopo River) is encountered the only occurrence of the Primary Schists—a formation frequently gneissose, and considered to be considerably older than the Namaqualand or Swaziland Series — yet found in the sub-continent. The most important (from an economic point of view) of the occurrences of the tilted schistose rocks of the Swaziland Series is the gold belt which has its greatest development in the Murchison Range, and runs through the mining areas of Marabastad, Woodbush, Thabine, Selati, and the Palabora region—a belt distinguished by persistent orebodies highly mineralised with gold, copper, antimony, and iron. In addition to the rocks of this age there are numerous and extensive occurrences of auriferous conglomerates in the Hænertsburg district that are exceedingly suggestive of correlation with the Witwatersrand formation. Near its south and south-west boundary occur the Black Reef and Dolomite series of the Potchefstroom System, the Pretoria Series being but poorly represented; whilst in the extreme south-west appear members of the complex of igneous and plutonic rocks constituting the Great Red Granite Laccolite, as well as the Amygdaloidal diabases of the Springbok Flats. The Waterberg Sandstone series is well represented, as it forms the chain of the Zoutpansberg Range of mountains, and a large outlier is found on the Limpopo River. The carboniferous system occurs in the Lebombo Range on the extreme eastern border, and outliers are met with in the valley of the Limpopo. Taking the different mineralised areas in the Zoutpansberg region in the order of their accessibility, the first to be noticed is the Marabastad Goldfield, where the first mine to be worked in the Transvaal, the "Eerstelling," was discovered by Edward Button in 1869. The orebodies of this area are only a few miles south-west of the town of Pietersburg—the terminus of the northern line of railway. The properties located here are the Frischgewagd Red Reef Mine, Knights Pietersburg, and certain holdings of the African and European Investment Company, situated on the farms Palmietkuil, Zand Rivier, and Snyman's Drift. The last-named is worked by means of adits. Only on the latter properties is any work being done, and encouraging results have for some time been reported. The next mineralised areas to notice is that near Chunie's and Malips Poorts, where the Black Reef Series and Dolomites overly unconformably granites and tilted schists of the Archæan System. Some small development has been proceeding intermittently in this locality, but with the exception of the "New Found Out" all work is for the present abandoned. This last, a quartz proposition in the tilted schists, is running six stamps, and returned 60 oz. of gold in September, 1906. Thirty-six miles east of Pietersburg is the hamlet and district of Hænerstburg, which is also known as the Woodbush Goldfield. In its vicinity are auriferous banket-beds, as well as gold quartz reefs in the tilted schists, to exploit which several syndicates and companies have been formed. The banket-beds lie along the summit of the Volkberg mountains (the local name for a part of the Drakensberg Range), and have been proved to extend over many miles. In this conglomerate formation several of the geological features noticeable on the Witwatersrand occur; indeed, it may be that they have some connection with the beds of that series. A little over three years ago a large number of claims were taken up along the "Berg" by the "big houses" of Johannesburg, but after a certain amount of exploitation had been carried out on them they were abandoned. Presumably the beds were found to be of too poor a nature to pay for working. The average yield per ton of the conglomerates appears to be only about 3 or 3½ dwts.; but, as a set-off against this low value, the situation of the beds on the top of the mountains should tend to make mining cheap. The two most developed properties on the banket-beds are the Pennyfather (about six miles from Hænertsburg), where a 10-stamp mill is erected, and intermittently at work under conditions that will probably keep working costs at not more than 10s. per ton; and the Mayflower, situated considerably to the west of Hænertsburg, close to the New Found Out. Near the Mayflower is the Pretoria Reef, which recently produced a little gold. Underlying the conglomerates is a series of tilted quartz lodes in the schists, which contain patches of fairly rich ore, and to work these the Woodbush and some other small mines were formed. Under the new proprietors, the Pioneer Syndicate, the Woodbush property is being worked in a small way, and is covering its expenses.

East of Hænertsburg, along the road to the Murchison Range, is the small community of Agatha, on the ranges overlooking which occurs the well-developed conglomerate formation. In the streams traversing this small area (known as the Thabine), and having their sources in this part of the Drakensberg mountains, alluvial gold is found in varying quantities. Intermittent efforts have been made to work these gravels, and still-born plans to start dredging propositions formulated. Contiguous to the Thabine field is the Murchison Range. Leydsdorp, the "capital" of the Low Country, is about 90 miles by road east of Pietersburg, and shares with the adjacent region a well-deserved reputation for unhealthiness. In the rainy summer months fever is rampant. This, coupled with the fact that transport charges over the rough roads from Pietersburg are very heavy, has done much to retard the development of the district. The most important company operating on the quartz reefs of the Murchison Range in this area is the H.E. Proprietary. This venture has proved the existence of two or more parallel reefs over a considerable distance, and is now developing a promising occurrence in the Free State Mine. The Harmony Proprietary and the Murchison Proprietary are two other concerns which have carried out a good deal of work in the Low Country and have opened up several rich shutes of

ore. The inconsistency of gold values and the occurrence of considerable quantities of antimony in the ores have been unfavourable features. Numerous other concerns have from time to time been formed to prospect the Murchison fields, the southern belt of which is frequently known as the Selati Fields. Of recent years the Bellevue and the Sutherland Reef have produced a little gold, but it appears that their developed pay ore was soon exhausted, and the properties are now virtually closed down.

The mining district of Klein Letaba lies about 135 miles north-east of Pietersburg and north of Leydsdorp. It consists of at least two distinct and well-defined belts of schistose formation running east and west. Some years ago (between 1892 and 1895) attention was directed to this district on account of phenomenal results obtained from the Birthday and other properties. The Klein Letaba and Ellerton Gold-mining Companies were formed and mills were started at the Birthday and Ellerton. The narrow and scattered sections into which the belt is broken, the great difficulties presented by severe "faulting" and dyke intrusions, the patchy nature of the reefs, lack of transport, and unhealthiness of the district eventually brought operations to a stand-still, and Klein Letaba was dormant until 1905. In that year the Louis Moore Gold-mining Company was formed to exploit claims at Tsama River, on a distinct belt a few miles north of the Birthday mine, where prospectors had secured encouraging results from gold in an igneous formation associated with micaceous and talcose schists. The Birthday plant was purchased and erected there, and the equipment was added to by grinding and settling pans. The development work carried out was, however, very small, and the starting up of the 20-stamp plant was unjustified. After two or three months of production—during which time the gold yield was much below what was anticipated—the property was closed down. To the north and north-east of the Tsama River belt lies an area, similar in characteristics and conditions, and carrying irregular ore-bodies of considerable richness, named after the Shinquidsi River.

Since the war very considerable prospecting work has been carried on in the schistose areas, in the extreme north of the Zoutpansberg district, and lying between the Zoutpansberg Range of mountains and the banks of the Limpopo River. Although the principal reward of this search has been rich copper lodes, numerous "discoverers' rights" have been located upon gold, and the further development of these discoveries will be watched with interest. The Government has thrown open for prospecting very large areas in these northern goldfields. The unhealthy nature of the Low Country, and the scarcity of water over extensive tracts, account for the absence of alluvial mining in a region where, in the nature of things, there must be considerable accumulations of "shed" and waterborne gold.

The Malmani Goldfields, and other Auriferous Areas.

In the extreme west of the Transvaal, not far from Mafeking and the railway line, a portion of the Marico district exists as a proclaimed goldfield—generally spoken of as the Malmani Fields—with Ottoshoop as its administrative centre. The formation in which the gold reefs occur belongs to the Dolomite horizon. It has been prospected and worked on a small scale intermittently for some 20 years. One reef, known as the Mitchell, gives promising prospects, but exploitation is rendered difficult owing to the enormous quantities of water encountered. Several undertakings have been floated to develop Malmani propositions, but gradually interest in the area has died out. The latest effort was made during 1906 by a Mr. Gubbins, leading to the erection of a small battery, but here, too, work has ceased.

The Schweizer-Reneke Goldfield.—Near the Harts River, in the Bloemhof district, a belt of highly tilted rocks of the Archæan System traverses the farms Goudplaats, Abelskop, and Botmansrust. It reappears again from beneath members of the Ventersdorp System further north in the Kunana Location, on the Bechuanaland border. The ore, of a hematite nature, occurs in irregular lenticular masses in the highly-contorted country rock. This has been actively and skilfully developed during the past three years. The area is conventionally included in the Klerksdorp mining district, and a more detailed reference to it in this work will be found under that heading.

Mention must now be made of a few "unconsidered trifles" in the way of goldfields that in other countries would command most respectful attention, but which in the Transvaal secure a merely passing attention. Giving precedence to "banket," notice has to be paid (in addition to the extensive conglomerate occurrences of Hænertsburg) to two other undoubted developments within the Transvaal of the Witwatersrand Series.

The Venterskroon Goldfields.—Fifteen miles to the south-west of Potchefstroom, on the banks of the Vaal River, the conglomerate beds of the Witwatersrand series are strongly in evidence, forming part of the belt of this formation that surrounds the Vredefort "boss" of old granite in the Orange River Colony, towards which—owing to reverse "faulting," probably—the reefs dip. Although some of the reefs show high assay values at places, work has been neither extensive nor properly remunerative in the past. The principal venture here is the Rooderand Gold-mining Company, which had a 20-stamp mill in intermittent operation previous to the war. This district, like many others, has suffered from attention being concentrated upon the Rand. When reduced working costs make it possible, the area may be expected to produce a large quantity of low-grade but payable ore.

The New South Rand.—Immediately south of Heidelberg, near the confluence of Kalk Spruit with the Vaal River, Mr. A. R. Sawyer has discovered the occurrence of the Witwatersrand formation (dipping southerly) in both the Transvaal and the Orange River Colony. The existence of the conglomerate horizons represented on the premier goldfield is proved. What calls for solution is the problem of the nature and payability of their mineralisation, and this solution is being sought by boring operations. The area under notice affords very remarkable facilities in the shape of accessibility, fuel, and water.

Turning now to quartz reefs, it is necessary to mention an interesting occurrence of reef and "shed" gold in a locality—some 40 miles due west of Krugersdorp and due south of the town of Rustenburg—that, in default of a better name, may be styled the New Brighton Area, from the name of the Company that is now conducting active operations there. The geological formation belongs to the shales of the Pretoria Series, and ore of promising value occurs as irregular quartz-bodies. A considerable quantity of "shed" gold was recovered by alluvial mining there some 17 years ago. There is a great lack of water in this locality.

The Malfo's Kop Fields.—Some 40 miles north of the town of Middelburg, within the Great Red Granite Laccolite, are two farms on the Blood River (Weltevreden and Rietkloof) that were proclaimed as public diggings by the Republican Government, and first came into notice as the Malco's Kop Fields. The mineralisation of this area, which seems intimately connected with that of Whitehead's old cobalt workings on the Selons River, with that of Rhenosterhoek, and with the old proclaimed diggings of Mapoch's Gronden, is highly complex, but most of the ores containing a remarkably high percentage of gold—principally in a refractory condition.

The Carolina-Komati Area.—In the watersheds of the Thee Spruit, Lekkerloop, and Zeekoe Spruit, southern tributaries of the Komati River in the Carolina district, is a long, narrow, and broken belt of schistose rocks (presumably belonging to the Barberton formation) that has been intermittently prospected for the auriferous quartz bodies it contains. A good deal of work of one description or another was done about 17 years ago on a venture called the Lionsdale, on the headwaters of the Thee Spruit.

The Piet Retief Area.—The Swaziland Series occurs in the Piet Retief district, as do also conglomerate beds belonging probably to the Lower Witwatersrand Series, and some interest has from time to time been attracted to auriferous quartz bodies and banket discovered there.

Alluvial Gold-mining.

One of the earliest statistical references made concerning the gold output of South Africa is to be found in Dr. Petermann's *Mittheilungen* for 1879, wherein it is stated that the "South African Gold Fields" had yielded, between the years 1866 and 1870 £23,000, in 1873-74 the product was £103,416, in 1874 it was £250,766, and in 1875 the amount obtained was £185,726. These figures are interesting, but it is difficult to ascribe to them any reliable source, as many alluvial diggers would have taken or sent their funds out of the country without making use of the banks, and without taking anyone into their confidence. It is reasonable to estimate the total value of the gold obtained by the alluvial diggers before they were turned off by the "concessionnaires" at nearly three-quarters of a million pounds (sterling). No record can now be made of the localities whence the alluvial diggers of those days won this gold, for they wandered far and wide into the then trackless and uncharted wilderness, and—innocent of the native languages as well as of the "taal," but greatly daring—returned to the *dorp* or trader's store blissfully ignorant of the names of the regions they had passed through or of the tribes they had encountered, but sedulously reticent both about them and the luck that had attended their venture. It is within the knowledge of the writer that, in those old days, considerable sums were won and secretly exported from the Tati, from Swaziland, from the Zoutpansberg district, and from the Mnrchison Range; and it is a reasonable inference that the bulk of the gold alluded to in Dr. Petermann's German periodical came from within the Transvaal. One of the first established mining camps in the Republic was at Mae-Mae, on the headwaters of the Blyde River, Lydenburg district, which was practically deserted in 1873 when the first "rush" took place to Pilgrim's Rest Creek. In 1874 (it is recorded in the *Gold Fields Mercury*, then published in Lydenburg) the Natal Bank alone exported £36,000 worth of virgin gold, and the Cape Commercial Bank over £70,000 worth. This industry went on steadily, but with fluctuating luck, until 1882, when nearly the whole of the then known mineralised area on the Lydenburg fields was given "over the heads" of the diggers at work on their claims to "concessionnaires" possessed of no shadow of equitable claim to the properties. This "concession" policy of the Boer Government effectually broke up the mining camps, and the diggers either sought fresh fields under other skies or wandered forth afresh with pick and pan, "billy" and "swag," to follow up the good indications of which they had been treasuring up the tradition imparted confidentially by some bold wanderer into the unknown veld. Many of the "old hands" had unrivalled skill and experience, acquired all over the world, from Siberia to New Zealand and Australia, and from Alaska and California to Patagonia. It was this scattering of the alluvial miners that was directly responsible for the discovery, in 1881, of rich shallow patches of nuggetty gold on the Duivels Kantoor (Kaapsche Hoop) and Barrett's "Berlin" farm, and for the resulting "rush" in 1882 of adventurers from Natal, and from Kimberley and other parts of the Cape Colony. The prospecting of the Kaap Valley immediately followed, a camp being formed first at Jamestown, and then on Moodie's farms, by which time the search for alluvial was steadily giving place to the search for reef—the latter culminating early in 1884 in the discovery of the Sheba and the founding of Barberton. But until 1884 that which encouraged and rewarded the miners was alluvial gold, and alluvial gold alone. "Reef" had been discovered and coquetted with on the Tati fields, at Marabastad (a short distance from Pietpotgietersrust), and near Pilgrim's Rest, without that branch of the industry "catching on" at all. Almost invariably the deposits of alluvial were small, patchy, disconnected, and either too far removed from streams, or too "drowned out" with water, to be workable on a large scale or in a thoroughly systematic manner. In many instances the clearest evidence was furnished in the claims, when wrought down to bedrock, that the ancients had at some far distant period turned over the wash in most workmanlike manner, and had "skimmed off the cream." From the dawn of reef-mining in 1884, alluvial mining has in the Transvaal steadily degenerated into "fossicking"—as the casual and precarious winning of waterborne and "shed" gold is colloquially termed—until the species of even the "fossicker" is almost extinct. Still, there is hardly an auriferous mineralised area known within the Colony that has not had, and could not still support, its tiny confraternity of alluvial miners and inveterate "fossickers," to keep alive the hope and chance of finding a "poor man's field" that could support that class of "individual diggers," the lack of which is a distinct loss to the mining community of South Africa. The importance of encouraging alluvial mining, and its more pretentious development "dredging," is clearly recognised by the Transvaal Mines Department, and the introduction of the sympathetic Gold Law under responsible Government will find the Executive officials prepared with practical assistance. Already the resources of the existing Gold Law are being as liberally interpreted as possible in order to remove the limitations by which the alluvial digger is handicapped. Section 31 of the Law is being taken advantage of, whereby the Commissioner of Mines is enabled to give out land under *mynpacht* lease in localities "where insufficient advantages are to be derived from the working of claims by individual diggers, or where land, after having been worked as claims, has been abandoned." Under this section, areas from 150 yards by 150 yards up to 500 yards by 500 yards in extent,

where the necessary conditions exist, may be given out, and it is hoped that the granting of these *mynpachts* will encourage the taking up and exploiting of localities suitable for dredging or hydraulic sluicing.

In spite of the discouragement that has so long prevailed, periodical small finds of alluvial gold in the Transvaal continue to be reported, chiefly from the Barberton region and from the Thabina area of the Hænertsburg fields, Zoutpansberg district. Claimholders and syndicates are turning their attention to the working of the alluvial deposits on a more extensive scale, trusting by a concentration of work and capital to make large low-grade areas pay a reasonable profit; and they anticipate encouraging results from the treatment of the heavy concentrates ("black sands") contained in the alluvial ground along the many streams in the various well-watered areas suitable for this form of industry. Large areas have already been acquired for alluvial *mynpachts* under the provisions of Article 31 of the Gold Law; but it is, unfortunately, hardly probable that the prevalent acute financial depression will permit of this new departure now receiving a fair trial. The general question as to the payability of propositions of this nature cannot be decided until one or more undertakings commence operations on an adequate basis. Owners prepared to do genuine work have every facility for proving their ground at the lowest possible cost, since the dues levied by the Government are small. The title granted is quite secure, provided that the ground is genuinely worked, and not locked up indefinitely for speculative purposes. The leases are usually granted on the following conditions:—

(*a*) The ground to be effectively beaconed off.

(*b*) The *mynpacht* dues to be paid in advance.

(*c*) Surveyor's diagram to be filed within reasonable time.

(*d*) Provided the *mynpacht* is worked to the satisfaction of the Commissioner of Mines, the lease (granted in the first instance for twelve months) may be renewed from time to time.

Should profitable results accrue from this new departure, the country will be materially benefited. A class of small mine-owners will be formed which, although rare in South Africa, is a recognised and important factor in other gold-producing regions of the world.

Diamonds in the Transvaal.

IN order to comprehend the main geological features that distinguish the occurrence of the diamond, it is necessary for the general reader to begin by realising that a diamond mine may be classed—for all practical purposes, but not in a scientific sense—as an extinct mud-volcano or geyser. Nor are these "pipes" (as the remains of the volcanic vents are called) rare; they are, on the other hand, surprisingly plentiful not only in South Africa itself but for some distance to the north. The bulk of those vents that have been met with by geologists and prospectors are entirely innocent not only of the diamond, but also of the few peculiar minerals invariably associated with the diamond and typical of its matrix. A very large number of "pipes" contain the associated minerals in larger or smaller proportion, but do not contain the diamond; a quite respectable ratio of the occurrences contain diamonds, but in altogether meagre quantities; and it is only the very small percentage of mines found that contain diamonds in sufficient quantities to make them worth opening up and working on a commercial scale. Then the quality of these very carbon crystals (which is the chemical classification of the diamond) ranges through a great variety of grades and values—from the splintered, brittle, and discoloured rubbish that fetches about 5s. per carat as an abrasive, to the absolutely colourless and flawless gem of moderate size that is keenly competed for by diamond-buyers at £25 or more per carat. So it happens that many a mine is found carrying a sufficiently large proportion of stones as regards mere quantity, but their quality is such that the mine does not pay to work; on the other hand, a mine may yield only a small proportion of stones, but of so high a grade as to make it a payable proposition. The quality of diamonds in mines adjacent to each other is often surprisingly dissimilar, and one of the most curious features about some "pipes" is the marked contrast in the quality of the diamonds from different portions of one mine. The fact being made clear that volcanic pipes are plentiful throughout the sub-continent, the next point to elaborate is that it is in the Central South African plateau that they are most numerous—in the great sedimentary formations grouped together as the Karroo System of rocks deposited in lagoons, lakes, and river-beds during Triassic times. In this connection it is noteworthy that the various well-marked series of the Karroo System are remarkable for an extensive and geologically interesting succession of igneous intrusive rocks of plutonic and volcanic origin, the youngest (topmost) of the sedimentary horizons being over large areas covered by volcanic lavas at least 4,000 ft. thick—lavas plainly due not to one, but to successive outflows of molten material. The aggregate of matter ejected during Triassic and Jurassic periods from the depths of the earth and spread over the ancient surface of what we now know as the northern and eastern districts of the Cape Colony, as the Orange River Colony and Basutoland, and as the Southern Transvaal, was—from evidence plainly to be read on every side—without doubt enormous. This

ejection on so grand a scale, together with the never ceasing accumulation of fresh material on the land surface, must have given rise to a steadily increasing weight on top and a steadily growing void in the bowels of the earth, the result of which would be the squeezing up to the surface of the last and lowest masses of molten material. In studying the circumstances of the Great Red Granite Laccolite of the Transvaal Bushveld, the intelligent observer has had borne in upon him the strong evidence pointing towards the segregation of the fluid magma into zones or layers of (in the lowest horizon) the heaviest and ultra-basic rocks, next the ordinarily basic types, above them the neutral rocks, whilst both logical inference and actual observation indicate that the last to cool out (so as to occupy the topmost position) were rocks of the acidic type. In order to get a vivid comprehension of what led up to the formation of the diamond-pipes of South Africa, it is justifiable (though not scientifically correct) to picture the source of the huge mass of molten material that was gradually extruded as a kind of laccolite buried very far underground. When the moisture-sodden land began to be raised from the watery deeps in which the several members of the Great Karroo System had been successively deposited—a system of a maximum thickness of not less than 14,000 ft.—and the conditions of plutonic activity were set up, it is only reasonable to infer that the acidic magma (the lightest in specific gravity and the topmost in relative position) was the first to be vomited forth. Gradually the zone of the neutral magma was exhausted, and then the material of ordinarily basic type found its way to the surface. At last, after the lapse of a period long even from the geological point of view, the expiring efforts of the pent-up forces were exhausted in driving forth the ultra-basic, the lowest and heaviest, remnant of the molten mass. In this manner can be pictured the formation of mud-volcanoes and geysers belching out the peridotite breccias and pyroxenes that we know as "kimberlite," or "blue ground"—sometimes with, but more often without, its burden of diamonds. Some students of the phenomena connected with diamond-pipes contend with much emphasis that the vents were formed by explosions due to the violent liberation of the steam and other subterraneously generated gases, but so much of the original pipe has been worn away through sub-aërial denudation of the Karroo strata that the evidence available in support of this theory is not conclusive. There seems to be no question but that the vents were formed in groups, and that not all members of the same group were formed at the same time. There must also have been in many cases a succession of extrusions in the same pipe; evidence in favour of such an inference is derived in part from the existence in different sections of very many mines of "blue ground" possessing entirely distinct features as well as of different physical characteristics and value. Pipes vary greatly in shape and size, but it is safe on this point to generalise so far as to say that the majority have a round to oval horizontal section, and usually are from 30 to 100 yards in diameter. Pipes of remarkable size seem to be richer as well as more payable to work. Although the kimberlite as a rule is friable and very easily affected by exposure to the air, sun, and rain, "blue ground" varies much in texture and hardness, there being present in all mines some ground too hard and refractory ever to be altered or softened by exposure. Breccia of this refractory nature, possessing all the constituents and other characteristics of true kimberlite, is known as "hardibank," and some mines—for instance, the Schuller pipe on Rietfontein, in the Pretoria fields—are composed entirely of it, and are therefore unworkable in the present state of our knowledge. Normally hardibank occurs only as occasional masses and kernels in the softer "blue ground." The very large majority of vents contain embedded in the volcanic matrix rock fragments that were torn from the walls of the pipe during the forcing of the "blue ground" through the earth's crust, or that had fallen into the vent from the rocks forming its original lip. When large—and some are big enough to weigh several hundred tons—these fragments are termed "floating reef" (the rocks constituting the walls being known as "reef"), and when small, "boulders." The latter are usually worn smooth and round, and in some cases the original structure and composition seems to have been altered into secondary minerals. As a rule the top of the pipe is, below the surface-soil, marked by a deposit of white calcareous tufa (lime capping), but in the Pretoria region this is replaced by a kind of ferruginous laterite, or "ou' klip" (as it is termed by the Boers).

Though the great majority of diamonds are derived from volcanic vents of Karroo or post-Karroo age, there is the most convincing proof that a certain proportion of the gems found to-day date from a very much earlier geological epoch. The diamonds found as a component part of the Black Reef conglomerate in the Klerksdorp region must obviously have been derived from the denudation of a matrix even more ancient. It is an open question in the mind of the writer whether "river-stones," which differ so markedly in physical characteristics and value from mine-stones, will not be found to originate in a hitherto unrecognised matrix belonging to the Ventersdorp System, or to a still more ancient formation. As regards the Pretoria region, its pipes are generally admitted to be of a date more recent than that of the Waterberg series, since fragments of that very characteristic formation are found embedded in the pipe-matter of the Premier and other mines; further proofs are not lacking to warrant the inference that they are at least contemporaneous with the Kimberley vents and with others occurring in the Karroo horizons.

The first diamonds actually discovered in the Transvaal were found in the Potchefstroom district in 1872, on the farm of one Theodore Doms. During boring operations in search of water, some seven stones, varying from 1½ to 4 carats in weight, were brought to light, but, owing to a change of ownership, and the congenial indolence of the Transvaal farmer, no active prospecting was carried out on the farm where the discovery was made. Yellow ground, containing garnets and other signs indicative of the presence of diamonds, had been noted, at the period of this discovery, by Bain, the geological expert, in other parts of the country, and the existence of diamondiferous deposits in the territories north of the Vaal River was a matter of faith at a period long prior to the discovery of anything in the nature of an actual mine. Some few years prior to the finding of diamonds on Doms' farm a "rush" to the Vaal River diggings had taken place in consequence of the discovery by a man named O'Reilly of a larger stone on the farm De Kalk, in the district of Hopetown—which discovery was responsible for the birth of the diamond-mining industry in the Cape Colony. These facts were known to the Government of the South African Republic, having been officially reported to the Executive Council of the State, but, although there was some slight stir and excitement among those of the population who were sufficiently enlightened to understand the extreme importance of the information, no serious effort was made to exploit this valuable source of wealth and industry. The discovery of

payable diamond mines in the Faure-smith district of the Orange Free State made but slight impression upon the minds of the inert population of the adjoining Republic. It remained until the enormous output of the Du Toit's Pan, De Beers, Bultfontein, and Kimberley Mines of Griqualand West, with the constant exodus of enriched or disappointed treasure-seekers, forced itself on the public imagination, before any serious attempt was made to gauge the resources of the Transvaal territories in respect to diamonds. The rush to the wealthier diamond fields had withdrawn many diggers from the Vaal River district; but, with the consolidation of big interests, and the consequent "squeezing out" of the small claim-holder, the "river diggings" once more came into favour. The land along the banks of the Vaal River as far as Christiana, pegged out by individual diggers, may be said to be the first diamond field of the Transvaal, and the yield of precious stones was considerable. With subsequent "rushes" that have occurred a larger area has gradually come under exploitation, but this extending scale of operations has not had the effect of increasing the value of the output, which maintains a steady average of some £30,000 per annum. Messrs. C. Wilson Moore and W. H. Carrington Wilmer, joint authors of "Minerals of South Africa," have placed it on record that up to 1893 the total yield of diamonds was valued at £4,000,000; including operations that have taken place up to the commencement of 1906, it may now be set down as some four and a half millions sterling. Thousands of persons have at one time or another made a living on these alluvial fields along the Vaal River, although the ground will not carry more than a few hundreds at a time, and in no instance has any digger been known to make more by his labour than what might be termed an ordinary competency. Some machinery has been erected, but no large profits have resulted from such investments. The source of the river-washed diamonds remains unknown. The stones found here are not of any great size, but they average a much finer quality than those extracted from the "dry" mines. Some of the diggings are situated at a comparatively high elevation above the river bed. The railway from the Rand to Fourteen Streams and Kimberley (which was completed and opened for traffic early in 1906) cuts through the "river diggings." After the British occupation of the Transvaal further prospecting in this region was disallowed, for reasons which do not yet appear to be thoroughly convincing, but early in 1906 fresh areas were proclaimed at Christiana, and a new "rush" took place, with, however, no results of any consequence reported (up to the time of writing) as regards new discoveries. Many of the diggers suffered heavy loss and disappointment, and it seems probable that the area already exploited contains the only really rich ground on these fields.

At Bloemhof, during the war of 1899-1902, the discovery of small diamonds around the officers' quarters and in the precincts of the old Dutch Church is said to have caused much excitement among the British garrison. Subalterns as a consequence devoted their leisure to "digging" in lieu of polo, and stones to the value of £700 are reported to have been picked up.

In 1893 an alleged discovery of diamonds on the farm Daspoort—one of the environs of Pretoria — where two or three small stones were said to have been found, caused a rush to that place. Excitement in Pretoria ran high, and the Government of the Republic, infected with the gambling mania through its rich gleanings from the gold mines of the Witwatersrand, encouraged the idea that an industry which might eventually rival De Beers was to be opened up. More small stones were produced on the occasion of a visit from the State Analyst, and (as no diamond law was then in existence in the Republic) prospective diggers were permitted to take out claims under the Stone Quarry Act! The claims, 100 ft. by 100 ft., cost £5. Although the whole affair turned out to be a palpable fraud, no action was taken against those responsible. The incident tended, however, to discourage prospecting and to discredit would-be discoverers. In spite of the attitude of distrust assumed towards those who still stoutly maintained that diamonds existed in the neighbourhood of Pretoria, the precious stones were eventually discovered on the farm Rietfontein, distant a few miles eastward from the capital of the Republic. This farm was subsequently acquired by the brothers Schuller, and in the years immediately preceding the outbreak of war "Schuller's Diamonds" was a well-known stock in which some important market transactions were effected. It was freely prophesied at this period that the diamondiferous area east of Pretoria would not only pay for development, but would be "another Kimberley," and the names of Messrs. David Draper and Pippin are associated with this opinion. No speculator was bold enough to back these views by large outlay, but interest in the fields was kept alive by the operations of the Messrs. Schuller, Messrs. Lewis & Marks, Mr. Dale Lace, and other well-known inhabitants of Pretoria and the Rand. No prospecting was allowed on the farm Elandsfontein (No. 85)—a specially tempting property of 3,300 acres—the owner of which offered the property for exploitation on the "take it or leave it" principle at the pre-war price of £25,000, a sum which was afterwards advanced to £55,000. No investor for this "pig-in-a-poke" proposition could be found until Mr. Tom Cullinan, a builder and contractor, of Fort Beaufort (Cape Colony), Kimberley, and Johannesburg, put down the necessary amount in conjunction with a few friends. The Boer owner, Prinsloo, was probably unaware of the promising nature of his property, and declined to sanction prospecting for fear that an adverse verdict might interfere with his chance of obtaining a "fancy price" for the farm. But Mr. Cullinan was confident in his judgment, and in January, 1903, personally commenced operations on what was subsequently named the Premier Diamond Mine. With a handful of natives for his staff, he worked and washed with his own hands, and almost from the start realised that he was part owner of the largest and richest diamond-mining area the world had hitherto known.

The Premier Diamond Mine.

Proceeding by the Delagoa Bay railway from Pretoria, past the Hatherley Distillery settlement and the Diamond Hill battlefield, and skirting the Magaliesberg Range, the junction of Rayton is reached. In the immediate vicinity are to be found the Montrose, the Kaalfontein, and the Schuller diamond-mining properties. Six miles from Rayton on a branch line of railway is Cullinan station, and the Premier Diamond Mine. The country here is said to resemble that at Jagersfontein (Orange River Colony). An oval depression, surrounded by hilly elevations, contains the "pipe," or mine. This pipe is the largest as yet known, and consists of upwards of 3,000 claims. The measurement of the depression containing the pipe is about one-third of a mile in breadth by half a mile in length—equal to about 4,000 claims of 30 ft. square—an area sufficient to embrace the four largest mines of Kimberley. From the very commencement of operations on the property diamonds were found in great abundance in the surface workings of

the Premier Mine, while it has also been proved that stones of fine quality lie at a depth of over 1,000 ft. The "life" of the mine for a great number of years is therefore assured. The "blue ground" is soft and easily manipulated, and the yield of stones is phenomenal. The profits of the first eleven months' working exceeded £100,000; stones to the approximate value of £1,900,000 had been recovered by the end of 1905; and the estimated yearly profits with full equipment are placed at close upon £2,000,000 sterling. The average quality of the diamonds from the Premier Mine is fair, and among the better classes are stones that will challenge comparison with the finest in the world. It is estimated that 40 years of working at an average washing of 2,400,000 loads per annum will carry the mine to a depth of 400 ft. only, and still the richest part of the mine, which is expected to produce five carats of diamonds to the load, will be untouched. The work of excavation is being carried on over a surface of about 350,000 square yards. A feature of the Premier Mine is the large number of stones of great size that have been discovered in the early stages of the work. Upwards of 25 stones ranging from 100 to 487 carats have been found, in addition to the great stone known as the "Cullinan Diamond," which weighed 3,024¾ carats, or 1·37 lbs. avoirdupois, and is of a value impossible to estimate. The stone was dug out of the ground in the wall of the mine with a penknife, and the finder, on taking it to the foreman, received a bonus which amounted to £2,000. The measurement of this, the largest known diamond, is 4 in. by 2½ in. by 2 in. It is considered to be a portion of a much larger stone, of a form impossible to define. Four pieces have been broken off, leaving four "cleavage" surfaces, and expert judges are of opinion that each of these four missing portions must have been of some considerable size. Four other surfaces are those of the natural stone. The "colour" of the "Cullinan diamond" is perfect, being of "blue-white" transparency. It contains several flaws, which do not, however, materially detract from its value as one of the purest and most perfect of the big stones at present known. The diamond was displayed to the public of Johannesburg before being despatched to England. As the safest method of transmission, this valuable gem was sent to England by registered parcels post, at a cost of 1s. 4d., with a maximum recoverable of £2. It is now said to be in London. The Premier stones are remarkable for their rough and dirty appearance when found. The mine is being equipped with the most up-to-date appliances, and the employés are well housed and accommodated and generously treated. The Premier Mine settlement is a prosperous and contented one.

Under the old Transvaal Mining Law the discoverer of a diamond mine was entitled to select and "peg off" one-eighth of the area proclaimed: the remainder could be pegged by the public. Special legislation was, however, introduced in this regard when the Executive of Sir Arthur Lawley became aware of the extreme value of the property held by Mr. Cullinan and his fellow-shareholders. A Diamond Ordinance was introduced in the Legislative Council by the Attorney-General, and was carried through in spite of determined opposition. By this Ordinance 60 per cent. of the profits of all diamond mines in the Transvaal extending over 100 claims was declared to be the property of the Government, the mine being first allowed to deduct the cost of equipment. Thus the Government, without the investment of one farthing in the enterprise, or running any risk, assumed the *rôle* of predominant profit-sharer, relegating a very inferior position to the independent claim-owner, who had to find all the capital, to run all the risks, and to carry all the responsibility. As no other mine in the Colony—one might venture to say, in the world—comes under conditions entailing this enforced and lop-sided "partnership," such special and unprecedented legislation naturally gave rise to much adverse criticism. The Government revenues in 1905 profited to the enormous amount of £550,000 from this source.

Supplementing by a few more technical details the general remarks already made about the Premier Mine, it may be noted that the "pipe" itself is almost entirely surrounded by an acid felsitic rock constituting the upper portion of an extensive sheet intrusive in quartzites of the youngest members of the Pretoria Series, of which quartzite the walls of the pipe are likely to be constituted at greater depth. The felsite is undoubtedly of an age considerably earlier than the formation of the pipe. The 3,515 claims (of 30 by 30 Cape feet) constituting the actual mine area have in nine spots been penetrated by boreholes to depths varying from 300 to 1,000 ft.; the ground passed through being: (1) surface soil; (2) red ground, often mixed with sand and boulders, and usually referred to as "overburden"; (3) yellow ground; (4) blue ground, occurring at an average depth of 35 to 40 ft. Nearly all the "blue" is readily friable and soft, and weathers easily, the only hardibank encountered having been met with in a borehole in the centre of the mine. The Premier pipe-matter, as far as its immense area is at present opened up (and already some 1,290 claims have been worked to an average depth of about 40 ft.), is of an unusually clayey nature, and singularly lacking in such normally associated minerals as garnet, serpentine, chrome-diopside, and mica. "Carbon" (ilmenite) is, however, markedly plentiful. The overburden, in which is reckoned the laterite capping, attains a depth of some 20 ft. towards the centre of the mine. Below this the "yellow" is frequently so mixed with decomposed sandstone and diabase to a depth of 25 ft. as seriously to spoil its value. This fact accounts, together with the necessity of clearing the surface of the whole pipe of the comparatively barren overburden, for the erratic and rather low yield from the Premier Mine during part of 1905 and 1906. Natural advantages in the way of water are by no means plentiful on the property. Until a definite and adequate scheme of supply was adopted, leases for water from three farms (distant from the mine five, eight, and eleven miles respectively) were entered into. Dams with a total storage capacity of 246,000,000 of gallons of water have been constructed. A water supply calculated to meet all future requirements (involving a pipe-line at least 22 miles in length) is being secured from the Wilge River. A special Parliamentary Bill has been obtained, and rights of way have been purchased. This scheme will necessitate an outlay of some £200,000.

During the early stage of the Premier Mine's development and the installation of the full treatment plant, two washing gears were erected at separate parts of the mine. These are known as "No. 1 Working" and "No. 2 Gear." The full equipment, known as "No. 3 Gear," commenced work about the middle of 1906. It is an exceedingly fine plant of 40-pan capacity, and is by far the largest and most elaborately designed diamond-washing installation in the world. The type of plant is known as the "McLelland," so named from the able engineer, Mr. T. G. McLelland, of Kimberley, who elaborated the system, which is automatic throughout. The mine-ground, after being loaded into trucks (a load measures 16 cubic feet), is hauled at the rate of some 15 trucks per minute to the apex of a bridge, from which point the trucks run by gravitation down an incline, tipping

the ground into "grizzleys"—an arrangement of steel bars, set in this instance 2¾ in. apart, which allow the finer portion to fall through. There are five of these appliances. The coarse ground passes into ten preliminary breakers of the Heclon "gyratory" type, and is reduced to pieces less than 3 in. in size. The next stage, at which the "fines" from the "grizzleys" joins the now broken coarse ground, is the passage through McLelland crushing-rolls (of these there are ten of 6 in. type and three of 4 in. type), into which it is fed by fan-feeders, and out of which it emerges in a quite finely disintegrated condition. The granulated product is then puddled in five sets of puddler-rolls (set in duplicate) provided with coarse teeth of special construction in order to break up any clayey lumps that may have been compressed into flat cakes by the rollers. The puddled ground is delivered on to feed-elevators that carry it up an incline to a 4-way hopper, whence it is distributed to the washing-machines—40 in number (of 14 ft. diameter), arranged in five groups of eight each, fixed in two rows one above another. In the first row of pans much of the heavier material in the mine-ground (the "deposit") remains behind with the largest proportion of the diamonds; such of the deposit and diamonds as escape with the discharge of the lighter material are concentrated in the lower pans. The tailings from the lower pans are waste material, and are removed by the cheapest possible means to refuse-depositing sites. The concentrates from both sets of pans are removed periodically to the pulsator-plant, where the final automatic separation of the diamonds from the "deposit" is effected. This plant consists of four pulsators, four automatic greasers, and 16 grease-tables. The deposit is very carefully hand-picked for the purpose of removing any stones that may have escaped elimination in the mechanical sorting appliances. A certain proportion of the ground coming away from the treatment-plant in the form of "cylinder lumps" and "hopper lumps" finds its way back again for re-treatment. The full capacity of the equipment is at least 8,000 loads per day. The management of this huge enterprise is nothing if not progressive, and in spite of the excellence and elaboration of the plant already at work, the fact is never lost sight of that improvements are possible and that unlooked-for obstacles are to be overcome. Such an obstacle the abnormally clayey nature of the Premier mine-ground may perhaps be reckoned. Experiments to establish improvements are unceasing. The most notable is the purchase of a tube-mill for the reduction of hard and clayey ground—which purchase followed on an extensive experimental washing conducted by the Company with a tube-mill at one of the Rand gold mines. The "dry" treatment, and pneumatic concentration of the deposit, are two other directions in which important tests are being conducted, but in these matters the Montrose Diamonds management is probably relatively more active than is that of the Premier. As to the quality of the diamonds recovered at the Premier, it has never been contended that it is of particularly high grade, but a considerable proportion of stones of the very highest quality and of large size have been found, and the experience derived from actual extended operations has been that the quality of the output is improving—as is also the selling price of diamonds. In regard to this last point, it is considered by the best judges that at least double the world's present output of the gems could be absorbed under existing conditions, and that the demand is certain to steadily increase. The tendency of prices appears, however, to be somewhat curious, for it is prognosticated that the value of the best class of diamonds will rise consistently, while inferior grades will realise less and less as the demand grows.

From the latest information available respecting the increase in the price of diamonds, an interesting statement is made concerning the product of the New Jagersfontein Mine. The price per carat was in 1887 an average of 28s. 4d.; in 1891 it was 37s. 2¾d.; in 1895, 31s. 1d.; in 1903, 54s. 2½d.; in 1905, 57s. 10d. Particulars published in 1905 showed that the relative value per carat of the diamonds recovered from the principal producing mines was:—De Beers Consolidated Mines, De Beers, and Kimberley pipes, about 52s. 10d. per carat; Wesselton pipe, about 36s. 11¼d.; Bultfontein pipe, 34s. 11¼d.; Dutoitspan pipe, 69s. 11d.; Jagersfontein pipe (owned by De Beers), 57s. 10d. per carat; and Premier Mine stones were of an average price of 23s. 6¼d. per carat.

The Montrose Diamond Mine.

The property of the Montrose Diamond-mining Company, Ltd., is next in importance in the Transvaal to the Premier Diamond Mine. This Company owns in freehold the farm Wyneb No. 74, Pretoria district, situated some 25 miles to the east of the capital. The Delagoa Bay railway traverses the property, on which is established the township of Rayton, at the junction of the Premier branch line with the main line. The Premier pipe lies about four miles north of this property, on which three diamondiferous vents have already been located, with fair indications of other discoveries to follow. Mine No. 1 is situated near the centre of the farm, a short distance to the north of the railway, and is a true pipe, with all walls excepting the northern one defined, of probably less than 100 claims in extent. It is proved to be diamond-bearing, and is doubtless the source from which were derived some 12,000 carats of diamonds that have been recovered in its vicinity. There is in the middle of the pipe a section of "hardibank" (kimberlite of so hard and refractory a nature that it refuses to disintegrate on exposure to the weather). The general nature of the pipe-matter is abnormally hard with an unusual admixture of clay; it has weathered well, and is very clean in character. A small test washing was made of ground from this pipe, which resulted in a yield of 288 carats from 653 loads (of 16 cubic feet each) of ground, equivalent to 44 carats per 100 loads. The mine is opened by an incline, and the work of "flooring" ground (in order to ensure its disintegration under influence of the weather) is progressing steadily. No. 2 Mine is situated on the Rooikoppies boundary of the property close to the northern beacon. Poor results only have been secured here, but they cannot be considered as conclusive. Mine No. 3 lies a short distance to the south-west of the last-mentioned pipe, and is already known to be not less than 1,200 ft. in length and 400 ft. in breadth. It is being opened up by three inclines, and shafts have been sunk down to the "blue." There is a shallow overburden overlying the pipe-matter, and below it a layer of clay covers the eastern part of the mine. A 52-carat stone was found on removing the overburden, and later a stone of 9 carats and another of 7 carats. That each stone came from a different section of the mine is an encouraging fact. The formation in which these vents occur is of the quartzites of the upper Pretoria Series, with intrusions of diabase and felsite, overlain by a small development of the Waterberg Sandstones. The Montrose Diamonds directorate is pursuing an exceedingly cautious policy, and commits itself to no expense beyond the systematic and exhaustive prospecting of its property. Those responsible for the policy of the Company realise that the conditions obtaining in the Pretoria diamond

region are peculiar and different from those prevailing at any other great producing centre, and they are averse to expending large sums in equipment that may speedily prove to be not the most suitable for the proposition before them. As their pipe-matter at the Montrose bears strong similarity to that of the Premier Mine, and there has to be faced the same difficulty of clayey lumps in the "yellow" and "blue" that defy ordinary treatment, the management is watching with interest the behaviour of the exceedingly large and costly plant erected at the Premier Mine. They are committed to no design of equipment, but are experimenting freely until the fullest resources of their property are accurately known, in the hope of arriving at a type of washing and concentrating plant thoroughly adapted to requirements. The results of their many experiments are stated to have proved the very satisfactory value of Mines Nos. 1 and 3.

Of the other diamond pipes opened up in the Pretoria region, it may be said that the Schuller pipe (the first diamond mine discovered in the Transvaal) may find it possible to treat its abnormally hard matrix ("hardibank") profitably by means of tube-mills, or other special appliances yet to be found suitable for the disintegration of the ground without injury to the brittle diamonds. The Schuller-Kaalfontein pipe and the Franspoort pipe contain ground that weathers well, but does not produce diamonds in sufficient quantity to be payable. On Roodeplaat No. 314, about the centre of the farm, which is situated some 8½ miles north of Hatherley station, the Oceana Company is doing exceedingly interesting prospecting work that presents indications of very great promise. A deposit of diamondiferous ground is being worked (over 120 diamonds had been won up to September, 1906), and there is every probability of the discovery of a pipe or large fissure from which it must have been shed. The ground has peculiarities, and the diamonds show a crystallisation and other characteristics that are stated to preclude any possibility of their having been derived from the Premier by denudation and travel.

Diamondiferous ground is found in many other regions of the Transvaal; for instance, in the Archæan System in the far north (Zoutpansberg district), on the Middelburg and Ermelo high veld, in the Lydenburg district (near Sekukuniland), and in the Rustenburg, Marico, Lichtenburg, Bloemhof, and Wolmaransstad districts.

The alluvial deposits of diamondiferous gravels in the Transvaal are plentiful in certain districts, and will doubtless prove of considerable and increasing industrial importance; but the lack of work on an organised and large scale makes it difficult to record satisfactorily the present position and prospects of this industry. Two alluvial enterprises were in September, 1906, at work in the vicinity of the Premier Mine, one of which was then considering an offer from that Company to buy it entirely out. At Christiana, in the extreme south-west of the Colony, the banks of the Vaal River are bordered by considerable deposits of diamondiferous wash, which give occupation to a community of diggers that fluctuates in numbers in proportion to the suitability of the seasons for alluvial mining operations. The banks and bed of the river have been proclaimed and thrown open as "alluvial fields" for a distance of some 25 miles below Christiana on each side of the Vaal—in both the Transvaal and the Orange River Colony. The Mines Department statistics for July, 1906, indicate that on the Transvaal side 108 individuals and syndicates were working there in that month. In August the number was 131. These figures, of course, do not include those diggers working in that portion of the river bed falling within the Orange River Colony. In the Wolmaransstad district, also, the bed of the Vaal is found to be rich in diamondiferous wash, and a very important enterprise has commenced work on a large and systematic scale on the farm Klipspruit, situated at the mouth of the stream of that name in a south-westerly direction from the village of Wolmaransstad. Other smaller ventures work intermittently in this vicinity. In the northern fields (Pietersburg district) in June, 1906, it is recorded that 34 carats of diamonds, valued at £160, were recovered by alluvial operations.

The latest available Government returns show that in June, 1906, there were produced from Transvaal diamond mines 77,562 carats, valued at £114,292; in July, 294,114 loads were washed, producing 74,973 carats, valued at £112,323 (a rate of ·255 carats per load of 16 cubic feet); in August, 480,018 loads were washed, producing 104,843 carats, valued at £157, 248 (a rate of ·218 carats per load. The following table of alluvial returns is interesting:—

District.	*Month.*	*Loads washed.*	*Weight in carats.*	*Value.*
Pretoria	June	—	1,391	£2,409
Christiana	„	—	229	1,215
Wolmaransstad	„	—	26	78
Pietersburg	„	—	34	160
Pretoria	July	6,589	1,322	2,501
Christiana	„	3,703	368	1,215
Wolmaransstad	„	2,218	44	184
Pretoria	August	8,821	1,686	2,913
Christiana	„	5,767	413	2,692
Wolmaransstad	„	3,511	71	217

Summary of outputs:—

January,	1906 ..	41,733 carats,	valued at	£52,201
February	„ ..	46,501 „	„	58,772
March	„ ..	72,562 „	„	95,082
April	„ ..	90,000 „	„	123,994
May	„ ..	92,315 „	„	135,277
June	„ ..	79,241 „	„	118,154
July	„ ..	76,708 „	„	117,265
August	„ ..	107,014 „	„	163,070

A well-informed authority has placed it on record that by the year 1908 the diamond output of South Africa may be estimated to amount to some 1,580,000 carats, in addition to the product of the De Beers group of mines, which output is taken to remain at about its present figure (say 2,166,000 carats). The estimated contributions are:—The Premier Mine, 1,200,000 carats; Lace Mine, 80,000 carats; Roberts Victor Mine, 100,000 carats; Voorspoed Mine, 200,000 carats.

The Base Metals and Minerals of the Transvaal.

IN a country so remarkable for its mineralisation as is the Transvaal, and possessed of so rare a "lucky bag" for the prospector in search of base minerals as the Great Red Granite Laccolite, a list of the Colony's resources is virtually as long as the index to any recognised textbook on mineralogy. Unfortunately, at the present time and under existing conditions, the Transvaal Colony is, in respect to base minerals, little more than a land of "samples"—interesting, suggestive, and rather bewildering in number and richness—and so long as heavy railway rates, scarcity of unskilled labour, the crippling cost of living, and the lack of fresh capital for fresh enterprise continue to hinder progress, so must be delayed the effective and profitable exploitation of the remarkable natural advantages now under review. In the Mines Department returns for 1904–5 the only statement dealing with base metals in the Transvaal contains the bald fact that the Colony in that year produced 123 tons of copper ore and 1,120 tons of lead ore.

Copper.

The success of the Namaqualand copper mines, situated in the extreme north-west of the Cape Colony, has, ever since the firm establishment of mining as an industry in the Transvaal, formed a powerful inducement for prospectors to locate a payable deposit of that metal within the latter Colony—especially as the schists and gneissoid rocks of the Swaziland Series were looked upon as the local representatives of the Namaqualand formation. But it must be confessed that a remarkable lack of success has attended such efforts, for to-day there is virtually but one region in the Transvaal (the Limpopo Valley, in the extreme north of the Zoutpansberg district) in which a payable copper proposition has been established. In many geological horizons, copper indications (marked often by extensive ancient workings) of more or less promise have been met with in widely separated localities, and have been developed to a certain extent. Representatives of the various large copper "combines" in Europe and America have spent months in inspecting prospects in the Transvaal and Zululand, and it may be inferred from their almost invariable abstention from investment in the first-mentioned country that they find nothing to suit them. It is evident, of course, that the unfavourable local conditions obtaining at present—heavy railway rates, expensive and difficult transport, shortage of labour, and lack of industrial facilities—are insuperable difficulties in the case of any but the highest grade propositions, whilst the great majority of copper occurrences in the Transvaal are of a type that call for expensive, expert, and practical prospecting before their real value can be proved. Thus a state of things exists in which the prospective purchaser declines to interest himself in a likely property unless its value has been pretty clearly demonstrated by adequate development, and the local mining man is quite unable to open up his holding because he cannot find anyone to support him financially on a scale enabling him to do useful work. Moreover, property owners have been spoilt by the fancy prices that gold and diamond prospects have commanded during "boom" times, and in consequence hold out for terms too high to tempt those who might otherwise take a fair mining risk in opening up unproved country. There is another factor of no mean importance that must not be lost sight of. In no part of the mining profession are judgment and experience more necessary than in estimating the value of a copper deposit. The really first-rate mining engineer knows that in the Transvaal there is no local experience whatever in copper mining to guide him, while as regards judgment he rightly holds that the judgment based upon conditions obtaining in other regions may easily prove a treacherous guide in a new environment. Hence the consistently conservative estimates that have hitherto been formed of the Colony's copper resources, and the persistent manner in which the larger and better-organised of Transvaal prospecting companies and syndicates (many of which have spent in vain a praiseworthy amount of money and energy in following up promising indications) have been led to abandon one series of copper options after another.

As is to be expected, the only productive undertaking is located in the geological horizon nearest akin to the Namaqualand formation. The Messina (Transvaal) Development Company, Ltd., and the Stratan Copper, Ltd.—both under the control of the Consolidated Goldfields of South Africa—have opened up a line of impregnation affording a series of ore-lenses in the gneissose rocks of the Archæan System (the Swaziland Series ?) in the valley of the Limpopo, in the extreme north of the Zoutpansberg district. The most important holding of the Messina Company is a block of 1,200 claims situated in the north-east corner of the farm Berkenrode, seven or eight miles from the Limpopo river, where the lode is reported to extend for about 8,240 ft. along the strike, and is marked by extensive ancient workings. Three or four parallel lode formations have been met with, and a strongly-defined main lode, striking about N.E. and S.W., maintains a thickness of from 2 ft. to 6 ft., and furnishes a rich copper ore of "glance" and other sulphides, and of carbonates. A little to the south of this a parallel lode is being worked, both lodes being opened at the 110 ft. and 220 ft. levels. The main cross-cut on the 110 ft. level has exposed, in addition to the two already specified, a third lode (not as yet touched), and still further to the south a diagonal lode of remarkable richness. According to a report from the mine on the 14th July, 1906, the main lode occasionally is 8 ft. thick, with "glance" occurring across the full width. The south diagonal lode has been driven on to a considerable distance, and averages 2 ft. in width. Five shafts have been sunk, and some 4,000 ft. of driving has been done, mainly on the upper level. The Messina also owns on the river the farms Tempelhof (7,000 acres) and Maryland (8,000 acres), both highly mineralised in parts. The ore is hand-picked and crudely concentrated (in the ratio of about three tons of ore won to one ton of ore shipped), and the product—averaging from 60 to 65 per cent. of metallic copper to the ton—is reported to contain a very high value in gold. So high is the grade of this selected ore that it is packed and transported (whenever the very casual ox or mule transport offers) to the railway termi-

ing at Pietersburg, whence it is shipped *viâ* Delagoa Bay to England. There it is sold on assay, realising about 10s. 3d. per unit, and earning a profit estimated by the experts of the Company at about £30 per ton. The policy for the future is to supplement the 266 tons already shipped up to August, 1906, by regular shipments of 100 tons per month. Of course, in addition to this remarkably high-grade ore there is a large tonnage of payable ore being stacked "at grass" and being developed in the mine. The Stratan Copper, Ltd., owns the farm Stratan, which lies some twelve miles northwards from Berkenrode. Such is the economic importance attached to these propositions that the owners have offered to find a quarter of a million sterling for the construction of a railway 140 miles in length to tap this area. The Transvaal Administration has, however, vetoed the proposal.

In the same geological series of gneissose and schistose rocks as the above occur the copper deposits of the Palabora (situated at the eastern extremity of the Murchison Range, and conspicuous for very extensive old workings that have never been cleaned out or prospected) and of the Barberton area (some 12 miles north of the junction of the North Kaap and South Kaap Rivers). In about the same horizon are found mines of auriferous quartz often comparatively rich in copper ores, amongst which may be mentioned some in the North Kaap area north of the granite boss of Barberton, and the Sheba Queen Reef near Steynsdorp, which seems to be a true fissure vein.

The next oldest geological series that affords indications of useful copper mineralisation is that of the Dolomites. At present the principal known occurrence is on the farms Storm, Morgenzon, and Rustplaats, a few miles to the south of Chunie's Poort (north of Mpahlela's Location on the Olifants River), Zoutpansberg district. In this vicinity active development has led to very encouraging results. Extensive ancient workings occur at Abjaterskop, immediately north of the Dwars Berg, west of the Great Marico River, Marico district. These workings have never been systematically explored, although they are less than 20 miles distant over flat country from the railway in British Bechuanaland. The beds immediately overlying the Dolomites—the Pretoria Series—contain the most extensive and varied distribution of copper prospects, being run pretty close in this respect, however, by the Great Red Granite Laccolite (Bushveld Igneous Complex), which has almost everywhere as its base the Pretoria beds. In the latter the most promising occurrences are considered to be more or less true vertical fissures filled with basic intrusive rocks, accompanied by lenses and chimneys (often of spathic iron) carrying sulphide and carbonate ores of copper with a considerable proportion of silver. The Willows-Boschkop-Transvaal Silvers line, running south-east from Pretoria, has already had considerable development work done upon it, and will doubtless receive serious attention when financial and industrial conditions improve. This horizon is in evidence at many localities in the Lydenburg, Rustenburg, and Marico districts, and interesting prospects have recently been examined in practical fashion near the Rooi Berg, close to the boundary of the Waterberg and Rustenburg districts, west of Hartingsburg. In many spots within the Bushveld Igneous Complex, in its wide distribution over the central districts of the Transvaal, copper ores occur. Sekukuni's country, Mapoch's Ground, the Albert Silver Mine region, and the neighbouring farm Sybrands Kraal, the Rooi Berg, and the region near Allewynspoort (some 30 miles northward from Zeerust) are a few places where the prospector has commenced to recognise the base metal possibilities of this unique formation.

The price of copper is so high, and the demand for it so great, that—once the characteristic conditions of its occurrence in the Transvaal are understood, and the commercial conditions for its extraction are more favourable—at no distant date a vigorous industry can scarcely fail to be established.

Lead.

Lead-mining is an industry of quite respectable antiquity (from a South African standpoint) in the Transvaal, as might be expected when a race of hunters and fighters such as the Boers moved into so richly mineralised a region as the territories beyond the Vaal River. From the days of the earliest *voortrekkers* until the use of breech-loading firearms became general, pioneers found and worked the most accessible deposits of galena for the casting of bullets. The interest of some of the mining men congregated at Kimberley in the early days was soon aroused by this fact, and quickly led to the establishment of one or two lead mines in the Marico district, not far from the main hunting road leading into the interior. The galena worked yielded as much as 80 per cent. of pure lead, and it is recorded that as much as five tons of ore was extracted in a single day—at a time, one would think, when some great fight with the natives was in prospect. The oldest geological formation in which lead ore occurs in any appreciable quantity is that of the Dolomites, where small pockets of galena (in some instances payably argentiferous) are frequent. A deposit of an encouraging nature is being developed at a spot about 15 miles to the south-west of Pretoria, on the farms Rooikranz and Hennops River. The more important venture is named the Transvaal Silver Lead Company. In September, 1906, this concern reported that the average width of the lode on the first level (reached by a shaft 150 ft. deep) was from 3 ft. to 3 ft. 6 in., that much of the ore assayed 84 per cent. lead and 65 oz. silver per ton, and that 300 bags of it were ready for shipment oversea. No other deposit in this horizon has yet been found sufficiently important to warrant serious exploitation. In the upper portion of the Pretoria Series, however, the mineralisation as regards lead is of distinctly commercial importance. Some of the best authorities adduce strong evidence in favour of this impregnation being directly due to the tectonic circumstances of the eruption and intrusion of the plutonic rocks of the Bushveld—in which connection it is instructive to find that the most important occurrences are situated in the upper portion of the Magaliesberg quartzites.

The oldest lead-workings in the Transvaal are at Hammerskop, General Snyman's farm, near the head of the Great Marico River, where the metal was won at least as far back as 1866. In the vicinity is Bray's lead mine, on the farm Rhenoster Hoek (211), where systematic mining and smelting was carried on for a number of years. The principal producer of lead ore to-day is the Edendale mine (situated on the farm of that name 16 miles east of Pretoria), to the north of Hatherley railway station. Here the galena carries from 10 to 20 oz. of silver per ton. Previous to the war, in the heyday of the Siemens-Halske method of the electrical deposition of gold from the solutions of the cyanide process, considerable quantities of the ore were treated by the Rand Central Ore Reduction Company in Johannesburg, and the local market for metallic lead was at least partially supplied from this source. The Siemens-Halske process is now, however, superseded, and the Edendale ore is shipped to a market

oversea. The Edendale vein contains galena in conjunction with zinc blende, the gangue being mainly quartz and calcite. Lower down in the Pretoria Series, between the quartzites of the Magaliesberg and Daspoort ranges of hills, is another horizon distinguished in the majority of instances by the presence of true fissure veins associated with dykes of basic intrusive rocks. Here occurrences of galena seem to alternate with those of copper ores, both being occasionally present in the same lode. The rather important deposits of the Transvaal Silver Mines—situated on the Willows - Bosehkop - Ondezwaanskraal line, between Bronkhorst Spruit and the Wilge River—of Moore's Hill, close to Waterval Boven station (Lydenburg district), and of the farm Witkop 228 (about seven miles due east of the Ottoshoop, in the Marico district)—the ore at the last-named containing zinc blende as well as galena—in each instance belong to this type of deposit. All these occurrences have been partially developed, and, though at the present time dormant, are capable of production on a considerable scale whenever local conditions are favourable. The ore at the Transvaal Silver Mine and Moore's Hill is iron and copper pyrites, tetrahedrite (with silver as an appreciable constituent), and copper carbonates in a gangue of iron carbonate.

In the Lydenburg, Rustenburg, and Waterberg districts, and wherever else the Dolomite and Pretoria Series are in evidence, occurrences of the various types described are also frequent.

Tin.

The subject of tin-mining is, at the time of writing, one of delicacy and difficulty in the Transvaal, for a "boom" of unusual dimensions has just collapsed, and a "slump" of equally unjustifiable proportions depresses the mining community. The truth seems to be that mining risks amounting to an enormous aggregate were lightheartedly undertaken with mere "half-baked" geological theories concerning the mineralisation of the Great Red Granite Laccolite for a working basis. These theories have not been borne out by the results of actual practice—though later they may well prove to have been not so very far amiss — and but little sound expert development has been undertaken to prove all the academic and financial speculation. The result is complete demoralisation, and the prevalence of an entirely false perspective in viewing an exceedingly important section of the Colony's natural resources.

Tin-mining in the Transvaal in its inception was indissolubly connected with tin-mining in Swaziland, for the division between the stanniferous areas of Oshoek (Steynsdorp Fields) and the farm Bettws-y-coed within the Transvaal border, and those of Fyfe's, Pullen's, and Henderson and Forbes' concessions, and the 'Mbabaan Tin Mines, within the Swaziland border, is purely arbitrary and political. Geologically and geographically the localities constitute one area. The occurrence of cassiterite (tin-oxide, the normal form of the metal's occurrence in its natural state) was first established by Mr. Sidney Ryan, and became known to those most keenly interested in South African mineral developments in 1889. The watersheds of the Steynsdorp Creek, the Black Umbelosi and the Little Usutu rivers, near the common boundary of the Steynsdorp Fields, and the Industria block of farms within the Colony, contiguous to the Swaziland border, are remarkable as a region where the gneissose and schistose rocks of the Swaziland Series are distinguished by a quantity of pegmatite veins carrying a varying percentage of cassiterite. In the gravels and soils resulting from the disintegration of these rocks a considerable quantity of alluvial tin is present, which fact has led to several recurrences of prospecting since the date of original discovery. Previous to the war about 700 tons of cassiterite had been won by sluicing, and shipped to England—a shipment in 1889 realising nearly £84 per ton, a most satisfactory price at the rate then prevailing for tin. In 1905 systematic work was resumed at 'Mbabaan (Swaziland) by the Eckstein firm, into whose hands the more important areas of stanniferous gravels had fallen. Stream-tin is now being steadily won and shipped from that vicinity, and steady profit is being made on a quite satisfactory scale—thanks to the high price to which tin has attained. This interesting development, however, cannot be legitimately credited to the Transvaal mining industry, Swaziland being from the administrative and political point of view entirely distinct from the Colony—on which account a detailed description of it is out of place here. Within the Transvaal itself, on the farms Oshoek, Houtbosch, Tygerkloof, and Hartebeestkop (all part of the Steynsdorp proclaimed diggings), and on the private farms Bettws-y-coed and Zwaluwsnest, a very considerable amount of development was done during 1904 and 1905 on the stanniferous veins of pegmatite, but the results were totally inconclusive as to their value as mining propositions. For one reason or another interest in this branch of prospecting has languished, and the whole tin area within this district of the Transvaal was, in September, 1906, in a dormant state, in spite of the price for metallic tin ruling at about £195½ per ton. A similar formation—also tin-bearing—occurs in the Low Country of the Lydenburg district.

It may here be explained to the non-technical reader that tin normally occurs in its natural state as tin-oxide, also known as cassiterite (its mineralogical name), black tin, and tinstone. The value of tin ore is stated either as the percentage of cassiterite (black tin) it contains or as the percentage of metallic tin (or "white metal") contained within it, and in computing the commercial possibilities of a tin proposition special care should be taken to note in which of these two terms the tin-contents of the ore is stated, for the difference between "1 per cent. of tin-oxides" (or black tin) and "1 per cent. of metallic tin" (or white metal) is very considerable. As an example, with the price of tin at £210 per ton—one of the highest figures it has ever reached—each 1 per cent. of black tin is equivalent to a value of 30s. per ton of the ore, and each 1 per cent. of white metal is equivalent to 42s. per ton of the ore.

Although specimens of rich tinstone appear to have been exhibited in Johannesburg prior to the war period, its true nature was not recognised, or if recognised was—on account of the comparatively low price of tin at that time—not appreciated at its true value. About 1890 the existence of stanniferous zones seems to have been known to the technical staff of Mr. J. C. Henderson, but, as silver was the more important metal, no attention was paid to tin. About the middle of 1903, a Boer who was engaged in cutting wood in the Bushveld, at a spot about 40 miles north-east of Pretoria, noticed sparkling crystals in the rock under a tree he was felling. For more than a twelvemonth he kept the specimen he gathered in his house, showing it at different times to numerous individuals, none of whom, however, recognised the mineral it contained. At about the same time some similar rock fell into the hands of a prospector familiar with the Bushveld region, who also sought information in vain as to the exact identity of the mineral contained in it. This man was ordered off the premises by a

Government official analyst in Pretoria, who did not know tinstone when he saw it, and had no time to test specimens he could not recognise. This occurrence of tin ore was met with close to an old road crossing the farm Enkeldoorns. The information came into the possession of the mining group identified with Mr. E. Brayshaw. Enkeldoorns and adjoining farms were secured, and prospecting was at once energetically commenced. The Boer woodcutter eventually took his specimen to Johannesburg, where its value was recognised, and the farms in the vicinity of the occurrence were secured under mineral option by the South African Lands and Exploration Company, of Johannesburg. Further search located an exceptionally rich outcrop on the farm Vlaklaagte 39 (which came to be the centre of the "Sallies," or S.A. Lands holdings), and as the knowledge of the extent of the tin mineralisation in this region spread, a wild "boom" set in. In April, 1905, a regular "rush" to secure the properties commenced, and in a very short time something like 2,000 square miles of virgin veld must have been taken up by established mining companies and a swarm of ephemeral syndicates.

The Bushveld tin area is well within the geological formation now widely known as the Great Red Granite Laccolite, or the Igneous Complex of the Bushveld. A description of the more interesting mineralogical features of this occurrence may be summarised for the information of the non-technical reader, from an account written by an official of the Transvaal Geological Survey, which may be depended upon as the result of examination by a highly trained and disinterested observer. The centre of interest under existing conditions lies at the farm Enkeldoorns, which may be described as virtually typical of the whole region. Over the greater part of the surface coarse red granite is seen, but in the extreme north a small portion of felsite is included, while over the north-west area a narrow and very thin strip of the Karroo coal-measures covers the granite. The essential constituents of the prevalent rock—the Red Granite — are red orthoclase (felspar) and quartz, arranged with a very coarse texture. The tin-bearing granite, however, shows in addition the effects of many secondary changes. The newer of the various types of granite is generally stated to be the ore-carrier, but this view is not agreed with; what is called the younger granite is considered by this observer to be a rock of entirely different age to the coarse granite, and is not necessarily the ore-carrier. In one of the most typical occurrences of tin-ore, the country-rock—a coarse red and fairly hard granite—is traversed by a number of divisional planes striking approximately north and south. To east and west the hard granite shades off into soft, decomposed, earthy rock, from which a series of vein-like offshoots (up to 3 in. in thickness) pass into, and sometimes through, the harder portion. The total breadth of the tin-bearing ground here does not exceed 12 ft. In some places a number of quartzose veins about 2 in. thick run through the coarse granite, but tin is found throughout both the veins and the country rock—usually forming specks scarcely visible to the naked eye, but also in string-like veins. A noteworthy feature of this occurrence is the absence of greissen. At Vlaklaagte nearly the whole farm is made up of rocks belonging to the Red Granite type, with the exception of the extreme western portion, which lies within the zone of felsite. The rock appears to be a true tin granite. Whether it is a true granite, or only a modification of greissen, there can be little doubt that it is of true igneous origin, and later than the country-rock of red granite. It probably represents the results of that form of igneous activity known under the name of pneumatolytic or fumarolic, which occurs as such an important factor in the typical tin-bearing localities of Cornwall and elsewhere. The discovery of topaz is of particular importance, as it tends to support the theory of the igneous origin of the ore-bearing rock, not only on Vlaklaagte, but also on Enkeldoorns, where the ore is also akin to granite, but which taken by itself does not so far afford any definite proof of the igneous origin of the tin.

Throughout the large area secured under mineral option by the many companies and syndicates a very considerable amount of surface prospecting was done, but not always on the wisest and soundest lines. The results have been inconclusive, and by the speculators were certainly considered as generally unsatisfactory. By the end of August, 1906, most if not all of the syndicates that had acquired interests in this portion of the Pretoria bushveld, and whose prospects at one time appeared so good, had closed down operations—on account either of exhaustion of funds or of unpromising developments—and the pioneer venture of the district, the Bushveld Tin Mines, had greatly restricted its operations. At this stage the startling suggestion was seriously put forward that development on the premier company, and consequently on other properties that had followed its lead, had been from the first carried out on an entirely mistaken basis, and the correct solution of the problem was offered. As work is being done to test this new and appealing theory, from which very important results may accrue, its essential features may be described. The prominent characteristic brought out by the exploitation of this region is the revelation of the generally erratic value of the lode contents. At one point high assay values may be obtained, and but a few feet away the value goes down to nil, or the mineralisation gives out altogether. It has always been believed that the true strike of the fissuring of the granite and its associated rocks, and consequently of the mineralisation on the farm Enkeldoorns (Bushveld Tin Mines), was north and south. Even so keen and disinterested an observer as the official of the Transvaal Government Survey already mentioned was quite clear and emphatic on that point. Another series of stanniferous zones were with equal positiveness located in Vlaklaagte (South African Lands) as striking east and west. After careful examination the author of the revolutionary theory asserted that the true strike of the fissuring was approximately N.N.E. by S.S.W. —thirty degrees east of north instead of being dead north, and therefore by so much out in the direction of exploitation. Naturally this puts an entirely different complexion upon the state of affairs, for it must be at once obvious to the least observant layman that if the work of development is done diagonally across the direction of several more or less parallel lodes each narrow body of tin-ore would be speedily passed through, and the bulk of the drive or trench would expose the quite barren country-rock. The new theory also explains the so-called "cross-courses" that have formed a marked feature in several of the reports made. It is claimed that development upon the newly-suggested lines is proving a belt of country some 400 yards across bearing ten or twelve distinct lodes within a short distance. Needless to state, this fresh development is watched with much interest, since it may result in the Bushveld Tin Mines and the whole contiguous area receiving a new lease of life.

The senior concern in this new type of tin venture, the Bushveld Tin Mines, has confined its attention entirely to Enkelsdoorn, where a very considerable amount of development has been

steadily put in over a wide area down to a depth of about 150 ft. (the first level). The crushing plant, with full equipment of concentrators and other metallurgical necessaries, is on a 10-stamp basis. The locality is badly supplied with water, which fact has necessitated the construction of two large dams of considerable storage capacity. When these are filled in the beginning of the rainy season (1906) the whole property will be carefully and continuously tested on a practical scale. It has been found impossible to ascertain (by means of assaying) the true tin value of the large amount of ground opened up; the only trustworthy test of the tin-contents is by actual work on a commercial basis.

The South African Lands and Exploration Company, after a considerable amount of prospecting on its various holdings, elected to develop the tin-lodes discovered upon the farm Vlaklaagte 39—eventually erecting a reduction plant there, starting crushing and recording the Transvaal's first output of tin at the end of April, 1906. The total amount of ore treated during that month was 687 tons; the percentage of tin-oxide per ton of ore treated was 2·44 (worth at the current price of tin 61s. per ton); and an exceedingly high rate of extraction was claimed. Unfortunately, it was immediately discovered that the stacks of tin "at grass" were practically valueless, and that through stupidity on the part of the management (the blame for which has never been publicly located) tin-contents of an altogether exaggerated and unjustifiable richness had been attributed to the rock developed. As a result, crushing was stopped soon after the end of July, development ceased, oblivion mercifully fell upon the whole concern, and public interest in the unfortunate undertaking died a natural death. The property at Vlaklaagte was, in September, 1906, already closed down, with the exception of prospecting work, which was being carried on continuously. The plant erected by both the Bushveld Tins and "Sallies," and the metallurgical treatment proposed, presented many exceedingly interesting features—which, however, need not now be seriously discussed.

Since the collapse of the Bushveld Tin "boom" exceedingly rich occurrences of tinstone have been met with in similar geological formation within the Great Red Granite Laccolite, near the Rooi Berg, and also near Hans Masibi's Location, both situated in the Waterberg district. The first mentioned occurrence is located by the Oceana Consolidated Company upon some of its farms situated about 40 miles west of the Warmbaths (Hartingsburg). The other occurrence is being exploited on the farm Groenfontein 871, some 18 miles north-west of the Pietpotgietersrust station on the Pietersburg railway line, by the Transvaal Consolidated Lands (under Eckstein control), as well as on the adjoining farm Solomonstempel 1014 (owned by a private syndicate with headquarters in Pietermaritzburg). All three undertakings are so averse to any parade or advertisement of the results they are achieving that detailed information regarding the extent and value of these remarkable deposits will be carefully withheld from publicity until practical work has demonstrated their commercial value beyond the possibility of question. It therefore only remains to be stated that the promise held out by all three ventures is exceedingly encouraging, and that there is now a reasonable hope of the Transvaal within no long interval entering the list of the world's steady tin-producers.

Magnesite.

The theoretical composition of magnesite—carbonate of magnesia ($Mg.,C.O._3$)—is oxide of magnesium ($Mg.O.$) =47·4 per cent., and carbonic acid ($C.O._2$)=52·6 per cent., but in fact it invariably contains small quantities of silica, ferric oxide, alumina, and generally lime (calcium carbonate). Deposits of this mineral are generally accepted as being the result of segregation from the magnesium rocks, and thus secondarily the product of the action of thermal waters containing carbonic acid upon rocks of the granite and syenite types. In most instances the magnesium rock can be recognised as actinolite schist, one of the insoluble residues resulting from the reaction indicated. It is considered that one stage in this process is represented, in addition to the actinolite schist, by the serpentines, and chloritic and talcose schists. All of these, as well as the primary rocks, are in evidence in huge masses in contiguity to the magnesite deposits now to be considered. This genesis is held to account for the generally irregular occurrence of magnesite bodies. It may be noted that occurrences of magnesite sufficiently large and pure enough to be commercially valuable are quite rare; at the present day such occurrences are practically confined to Greece (whence the best grade of this mineral is derived), Hungary, Austria, and California. The supply from the last-mentioned country cannot keep pace even with local requirements; the Hungarian and Austrian deposits are not of high grade. In comparing the raw mineral derived from these, the only five commercially considerable deposits known at the present time, it may be stated that the best raw specimen of Greek magnesite averages some 97·8 per cent. of the pure mineral, the Transvaal magnesite averages some 97·07 per cent., ordinary quality Greek averages 94·46 per cent., Hungarian averages some 90·24 per cent., Austrian about 81·45 per cent., and Californian about 93·6 per cent. In its crude state magnesite is in considerable demand for the purpose of generating carbonic acid gas, this being the only source from which the absolutely pure artificial gas can be obtained—the bye-product, Epsom salts, being now very extensively used in the arts and manufactures. Calcined magnesite is chiefly employed in the manufacture in one form or another of magnesite cement, which is now manufactured in such a form as to permit of its being packed and handled in exactly the same manner as Portland cement, and to enable any intelligent man in the ordinary way and without any special instruction or experience to use the one as freely as the other. In appearance there is but little difference between the two materials, but the pure quality of magnesite cement is never less than from six to eight times stronger than the best Portland. The ordinary grade of magnesite cement is sold in drums weighing 200 lbs. each) of practically the same cubic capacity as an ordinary barrel of Portland (weighing 400 lbs.), but its strength and binding power is three times greater than the same weight of the latter; thus, 200 lbs. of the magnesite article is equal (for many purposes, indeed, markedly superior) to 600 lbs. of Portland cement, with the additional weighty advantage of saving two-thirds of the freight charges. In Europe, for first-class work, practical men pay for magnesite cement two and a half times the price of Portland; the South African Company will be very well paid indeed in selling their product at a price very much under that of Portland cement. It is peculiarly well adapted for engine foundations, reservoirs, armoured concrete foundations, the manufacture of artificial stone, flooring, and roofing, and for kindred purposes, the fireproof qualities of all magnesite manufactures being their not least valuable feature. A large trade is developing out of its application for jointless floors, and for sewage works and drain pipes; it is also used

in rapidly increasing quantities in the manufacture of plate-walls, floor tiles, decorative tiles, and decorative ceilings; its qualities as a non-conductor of heat opens out a large field of usefulness in the form of paint; its hydraulic qualities are very remarkable. In some of its forms this material can be used for every purpose to which plaster of Paris is adapted. Magnesite, though very basic, does not combine with the acidic minerals such as silica. This quality, together with that of its absolute infusibility, renders its use imperative in some of the most important branches of metallurgy, for such purposes as steel and other basic open-hearth furnaces, kilns, firebricks, cupels, and general assay requisites. Its extraordinary durability, freedom from moisture, and resistance to corrosion when exposed to the action of basic slags and metallic oxides, throw into the shade every other available material. Calcined magnesite is found to be specially suitable for replacing white lime in the cyanide process. It seems to be more effective, and is markedly cheaper.

The deposits owned by the Magnesite Mines of South Africa, Ltd., and held under the usual mining title covering 7,219 base metal claims (19,800 acres), are situated on Government ground between Kaapmuiden and Malelane stations on the Johannesburg-Delagoa Bay railway. The area is roughly eight miles long by 1½ miles wide. In view of the future possible extension of the business the Company has arranged with the Government for a lease of the land adjacent to its claim-holding. The magnesite is located in a range of hills running parallel with the railway and with the Crocodile River. The locality is distant about 87 miles from Delagoa Bay and 300 miles from Johannesburg. The quantity of mineral here is virtually unlimited, the deposits being of great magnitude. The quality is equal to that of the best pure white magnesite from the island of Euboea, Greece, and undoubtedly should enable the South African venture—under anything like equal commercial conditions—to compete in almost any market with the mines in Europe. The largest of these is in Austria, and has, owing to the inferior grade of its raw material, to limit its business to the sintered magnesite largely used in steel furnaces and for kindred purposes. The Magnesite Mines of South Africa, Ltd., is a Johannesburg concern, with a nominal capital of £200,000, all the shares having been issued (at the date of the first annual general meeting on March 7th, 1906) with the exception of 36,900 shares in reserve. Additional funds had to be provided for the completion of the works, the bank overdraft at the date mentioned being specified as £4,424. The works are connected with the main line of railway by one and a half miles of mono-rail, which is found to act very satisfactorily. A private siding has been constructed at a convenient spot. Mining operations provide three points of attack, and they show that in depth the deposits widen and improve. At one working alone the quantity developed is estimated at over one million tons. The motive power for the plant used by the Company is supplied by a suction gas-engine, described as being specially suitable for the country and for this class of work. Four kilns of the best and most modern type are erected, capable of producing 40 tons of calcined magnesite daily, and four supplementary kilns are under construction, which call for no increase in the other departments of the equipment. The milling plant is of the most effective description. This is important, as the grinding of magnesite is a most difficult and intricate process. In addition to the cement factory there is a plant for the production of chloride of magnesium. A 6-h.p. oil engine, pump, and 9,000 ft. of pipe-line led from the Crocodile River ensures an adequate water service. It is interesting to note that the estimated value of Portland cement used in the Transvaal during 1905 was £175,000. Magnesite cement is manufactured at the works of the Magnesite Mines in two grades. "No. 1 cement" is made from a combination of chloride of magnesia and calcined magnesite, and one ton binds 40 tons of sand (its capacity being at least eight times that of Portland cement); "No. 2 cement" is made from ordinary calcined magnesite, will bind 12 tons of sand, yields a product that will bear a crushing strain of 2,879 lbs. per square inch (as against the 1,536 lbs. of its rival), and is equal to four times the weight of Portland cement.

The ultimate success of a venture of this nature depends primarily upon the purity and quantity of the deposits, and secondly upon cheap mining, effective calcination, treatment, and transport facilities. As a technical staff of the highest calibre is now energetically at work, and as the other factors are fully attained, the prospects of this most interesting undertaking seem assured.

Iron.

The Transvaal is probably as well equipped in the matter of natural resources and advantages for the establishment of a vigorous iron industry as any country in the world. Enormous deposits of iron ores are available in nearly every district of the Colony; coal is present in most districts, and extremely plentiful in some; limestone and other basic rocks suitable as fluxes are in great abundance in localities easy to tap by means of railways; magnesite and fire-resisting clays suitable for furnace linings are perhaps in better and greater variety than in most countries, and gannister and moulding sands are in quantities sufficient to supply any reasonable demands. The drawbacks to development are chiefly the neglect up to the present to determine upon a really good coking coal, heavy railway freights, and the dearness of labour. To overcome these obstacles should not be very difficult, for it is assuredly only a question of experiment to find either a coal sufficiently strong to serve for smelting purposes or one suitable for the production of good coke. The railways will in the near future have to be liberated from their false economic position as the chief revenue-producers for the various South African Governments, and be run for the purpose of earning only a fair commercial profit; and the reduction of the costs of living will make labour less expensive.

The geological formations in the Transvaal put forward as being the main sources of iron-ore in practically inexhaustible quantities are as follows:—

(1) The Archæan, Barberton, and Witwatersrand series, and all associated horizons in which occur the banded ferruginous shales, or "calico rock" (familiar on the Rand as "Hospital Hill Shales").—These red oxides afford a limitless supply of ore specially suitable for iron-smelting, owing to the low contents in phosphorus and sulphur. Enormous tracts exist north of the Delagoa Bay railway, in close proximity to coal and lime.

(2) The interbedded deposits of magnetite in the lower members of the Pretoria Series.—The layers of this ore range in thickness from 3 ft. to 10 ft. or more. A typieal analysis gives ·68 phosphoric acid, ·15 sulphur, and 67·16 iron oxide—which compares very favourably with the best-known ores of the large steel-producing countries. This formation is strongly developed over enormous areas of the Transvaal.

(3) The segregations of iron ores in the lower and basic (often ultrabasic)

zones of the Great Red Granite Laccolite.—In these segregations deposits of chromite alternate frequently with deposits of magnetite. The latter is occasionally rendered somewhat refractory for the smelter's purpose by a varying proportion of titanic acid, but the chromite deposits are—as far as they have been hitherto studied—free from this not very serious objection. In Sekukuniland, in the Botha Berg to the north of the town of Middelburg, along the northern face of the Magaliesberg between Pretoria and Rustenburg, and in the Pilands Berg, Rustenburg district (as well as in other widely-distributed developments of this formation in the Bushveld), enormous bodies of these segregations have already been located.

The value of the metals and machinery imported into the Transvaal during 1904 was £2,933,474. This fact will give a slight idea of the demand to be catered for by the products of a local iron industry.

Mercury.

Cinnabar, the usual and most abundant ore from which mercury is obtained, occurs in the Eastern Transvaal in the Marico and Rustenburg districts, near Pretoria, and in the neighbourhood of Pietpotgietersrust. The only occurrence of possible value from an economic point of view is on the Buffels Spruit, a tributary of the Lomati River, on Government ground some twelve miles due south of Malelene railway station (Delagoa Bay line). The cinnabar is associated with a quartzose gangue in a vein showing itself over a considerable distance of strike, the formation being sericite schist of the Archæan system. A good amount of development has at one time or another been done on this occurrence, and it is quite possible that further work will prove the cinnabar to be present in quantities commercially valuable.

Cobalt.

This mineral occurs not infrequently within the region influenced by the Great Red Granite Laccolite. Amongst the localities in the Pretoria, Middelburg, Rustenburg, and Marico districts in which it has been met may be mentioned the Selons River (some 30 miles to the north of Middelburg), and Balmoral station, on the Delagoa Bay railway. The late Mr. Percy Whitehead carried on mining operations at the former locality in 1885 and for several years subsequently, exporting a considerable quantity of cobalt—until the market for it was glutted. The average price obtained for the ore shipped oversea was £158 per ton, while some realised as much as £405 per ton.

Platinum.

This metal, associated with a still smaller proportion of osmium and iridium, is found as traces in the auriferous conglomerates of the Witwatersrand formation, and in somewhat more appreciable quantity in the Black Reef conglomerates, notably in the vicinity of Klerksdorp. It has been known to occur in the proportion of 1½ oz. per ton of ore.

Radio-Active Minerals.

Pitch blend (an ore of uranium) has been known to occur near the Willows mine, not far from Pretoria, and in the Pretoria and Waterberg Bushveld igneous complex. Euxenite (an ore of thorium and its associated earths) is found together with monazite in the tin-bearing gravels of the Swaziland Series. The radio-active properties of these rare minerals are being studied by one of the most able chemists in South Africa, and exceedingly interesting results may be confidently anticipated.

Other Minerals.

To mention the innumerable other minerals found to occur in the Transvaal would be merely to string together the names of a long list of ores and raw materials mentioned in every book on mineralogy. This article may therefore be brought to a close with a summary of the latest available returns of the Transvaal Mines Department dealing with the products of chemical and metallurgical works and of such other industrial concerns as come within the purview of the Government Mining Engineer.

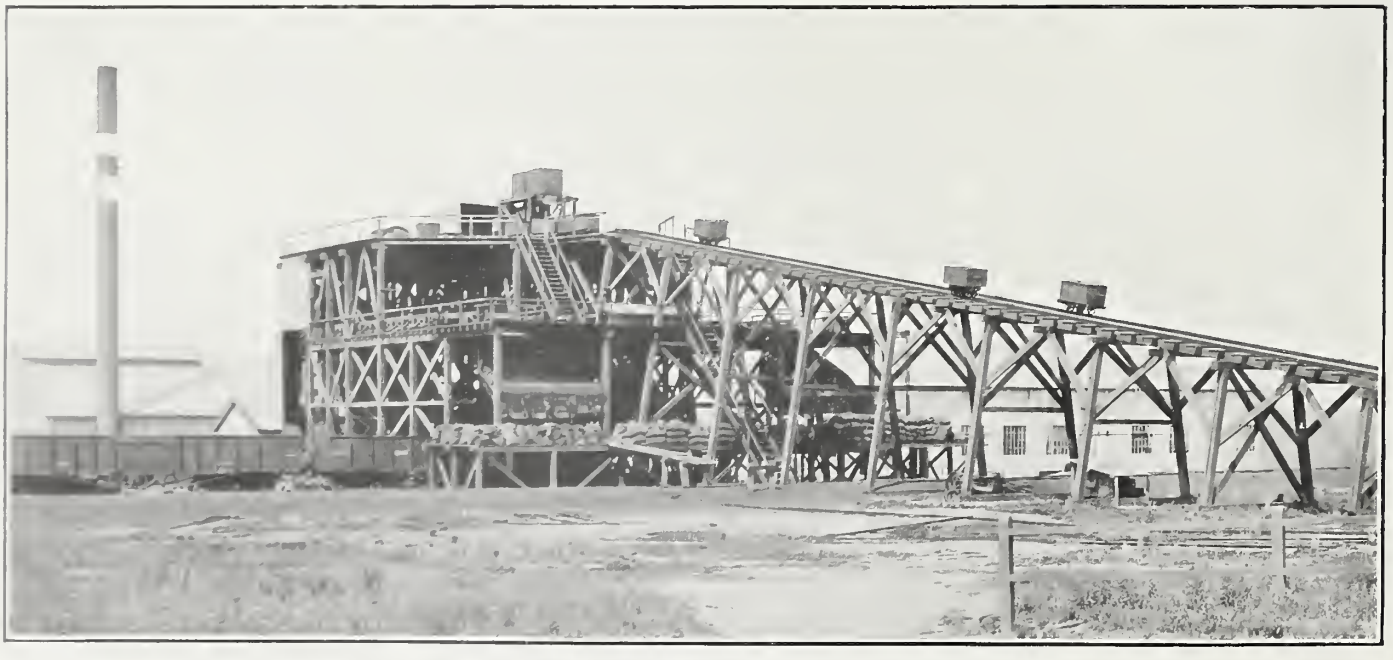
	Official year 1904-5.		*Official year* 1903-4.
	Weight or quantity.	*Value.*	*Value.*
Chemicals		£22,459	
Manures, paints, disinfectants, etc.		2,175	
		£24,634	£23,431
Bricks (building), machine-made	59,015,815	£187,898	£114,698
,, (fire) ,,	1,000,000	9,412	8,726
,, (special, fancy, moulded), machine-made	940,083	7,733	2,425
Granite (dressed)	430 cube yds.	3,488	
Sandstone (dressed)	2,083 ,,	30,211	37,704
,, (undressed)	11,745 ,,	5,351	
Stone (broken and rubble)	30,347 ,,	10,968	
Slate (dressed)	1,770 ,,	5,852	9,086
,, (undressed)	704 ,,	950	
Cement	1,023 tons	5,637	24,355
Chimney pots	457	290	
Flower pots		761	
Pipes (earthenware)		17,922	6,253
Tiles, roof (earthenware)		1,789	
Garden-edge (earthenware)		161	
Traps (earthenware)	81	119	
Fireclay	870 tons	2,654	
,, slabs	950	160	
Lime (white)	9,080 tons	27,958	56,486
,, (blue)	21,856 ,,	40,091	16,628
,, (hydraulic)	2,021 ,,	3,992	
Salt	1,016,400 lbs.	2,159	781
		£365,556	£301,758

* At the time of writing the Zoutpansberg Salt Company was still the only producer in the Transvaal. The "saltpan" from which its product is obtained is situated at the western extremity of the Zoutpansberg Range, the occurrence being on the contact of the Waterberg Sandstones with the granitic rocks of the Archæan System. Another producer was speedily to enter the field in the shape of a concern leasing the "saltpan" lying some 25 miles to the north of Pretoria. This body of brine rests in an extinct volcano crater within the Great Red Granite Laccolite.

The Coal-mining Industry of the Transvaal.

THE Transvaal is remarkably well provided with coal resources, and compares favourably in this respect even with countries ranking amongst the world's storehouses of that most necessary adjunct to modern civilisation. Already coal takes its place next to gold and diamonds in economic importance in South Africa, and more markedly so in the Transvaal. Under ideal conditions, the many different varieties of fuel with which the Colony is blessed would be utilised freely in at least seven distinct directions—for the mining of other minerals; for steam-raising, creation of energy, and kindred purposes in connection with general industrial enterprises and manufactures; for smelting iron, copper, and other metals; for locomotive and agricultural purposes; for domestic and municipal requirements; for maritime purposes, and for export. Up to the present, however, the highest position the coal industry of the Transvaal occupies is that of a mere handmaiden to gold-mining, with a furtive distribution of her spare favours to the railways and to the homes of the people and municipalities. In such circumstances it is scarcely needful in a work professing to interest the non-technical reader in a non-technical way, to touch other than perfunctorily upon the more detailed technical and statistical features connected with coal-mining and colliery management as existing in the Transvaal. Not until the rates of freight (not only throughout the Colony, but to the ports) and the cost of mere living are materially cheapened will coal-mining come to be treated and studied as one of the Transvaal's leading and independent industries.

Coal-mining commenced in the Transvaal shortly after the discovery of the banket-beds at Johannesburg. Previous to this, coal was only worked by the farmers from outcropping seams, generally at the bank of a stream, or in the side of a hill, excepting in one instance, where, during the early eighties, Messrs. Lewis & Marks opened up coal-beds at Vereeniging, on the Vaal River, and sent coal to Kimberley by ox-wagon. When prospecting for gold first started on the Rand, in 1885, the only supply to the district of coal for such purposes as blacksmithing was derived from Vereeniging, or from the Wilge River and Steenkool Spruit seams, situated close to the main watershed of the country not far from the present road to Bethal. The supply was exceedingly limited, and the product was sold at as high as 80s. per ton in Johannesburg. In December, 1887, prospectors sinking for gold on the farm Vogelfontein (now Boksburg) struck a seam of coal 16 ft. in thickness. In one shaft on what was then called the Holdfast Main Reef Gold Mine, a conglomerate bed was discovered immediately under the coal, and specimens were shown of dwyka conglomerate (miscalled "banket" ore) with coal attached to it. The Company owning the proposition is now amalgamated in the East Rand Proprietary Mines, Ltd. Shortly after the coal discovery at Boksburg several small coal mines were floated, and hundreds of ox-wagons were employed conveying the fuel to the gold mines along the Reef, and to Johannesburg for household and kindred purposes. It was soon found that there was only a very small basin of drift coal at Boksburg, and in 1892, through a fall of roof at one of the mines, some hot ashes thrown out from the boilers found their way down one of the fissures and set fire to the coal in the mine.



COAL MINE HEADGEAR, BELFAST, TRANSVAAL.

This fire could not be kept from spreading, and gradually destroyed all the mines in the Boksburg district. In 1888 coal was discovered at Brakpan, in a shaft 92 ft. from the surface. The coal ran from 14 ft. to 18 ft. in thickness, and was of a quality a little better than the Boksburg coal, but also with a high percentage of ash. It has been found to be a good steaming coal, and gives about 9 calorific power. [NOTE. —The phrase "calorific power is 9" denotes that 1 lb. of the coal under consideration would convert 9 lbs. weight of water into steam at a temperature of 100° centigrade. The average calorific effect of Welsh coal is about 13, and that of Newcastle-on-Tyne coal about 12¾.] But for the discovery of coal at Boksburg and Brakpan, the Witwatersrand as a gold-mining centre would not be in the position it is to-day, as the supply of cheap coal helped to pull many gold mines "out of the mire," after having been floated with too little working capital. Almost immediately following the discovery of coal at Brakpan, a seam of coal was found at Springs, also of good thickness, and ranging from 18 ft. to 24 ft. The only mine working at Springs for several years was the Netherlands Railway coal mine. This supplied the railway with fuel for several years, but eventually it was found that the coal "pinched out" towards the north, although to the south and east it became of a much better quality and thickness. In 1892 the Cassel Coal Company was floated, after having secured portion of a farm next the Netherlands Railway coal mine. Soon afterwards, the Great Eastern, Clydesdale, and De Reitfontein mines were floated, and for many years the bulk of the coal used by the Rand gold mines was supplied from this source. The calorific power of the coal here ranges from 10 to 10·5. In the early days of the Rand, the Boksburg and Brakpan Collieries were fitted up with very primitive apparatus for screening their product, although there was a big proportion of dirt, shale, and splint-coal to pick out. Sir George Farrar, who was in 1891 Chairman of the Transvaal Coal Trust, saw that there was a big future for coal-mining in the Transvaal, and he ordered from Scotland an up-to-date screening plant, consisting of mechanical tipplers, shaking screens, travelling picking belts, elevators, and other modern appliances, which was placed at a new shaft sunk at Brakpan for the purpose. In 1892 the output from this mine was 1,200 tons of saleable coal in a working day of 10 hours.

For several years Brakpan and the Springs Collieries supplied the bulk of the coal for the Witwatersrand gold mines, and for general purposes in the towns—the Vereeniging Colliery being fully employed in supplying the needs of the Cape Government Railways and the requirements of Kimberley. The blacksmith and gas coal came by ox-wagon from the outcrop coal-bed on the Middelburg and Bethal high veld. On the opening of the Johannesburg-Pretoria railway to Delagoa Bay, the Witbank coal-beds (about 6½ hours' journey by rail from Johannesburg) were opened up. The Douglass Colliery, Witbank Colliery, Transvaal and Delagoa Bay Collieries, and Landau Colliery were in full working before the war, and were followed immediately afterwards by the Coronation Colliery and the Middelburg Steam Coal and Coke Company.

The Douglass Colliery is an adit mine, and is working a seam of coal 10 ft. in thickness. The appliances for screening are the primitive bars, similar to those used in coal mines in England 30 years ago. The coal is hauled out of the mine by mules. Its calorific power is from 11 to 12·3. It is slightly inferior to the Witbank product, but as it can be worked more cheaply, being taken from an adit mine, and the position of the colliery being a little nearer to the Rand than Witbank, it can hold its own. The output is about 600 tons per day.

The Witbank mines are to-day the premier coal mines of the Transvaal—in fact of South Africa—only one or two of the Natal collieries rivalling them in output. They supply the greater portion of the coal used by the railways.

VIEW OF THE CLYDESDALE COLLIERIES AT SPRINGS (30 miles east of Johannesburg).

The following figures show the amount of saleable coal actually sent away from the collieries above-mentioned :—

	Tons per day of 10 hours.
Transvaal and Delagoa Bay Collieries	1,400
Witbank Colliery	1,100
Middelburg Steam Coal and Coke Company	800
Coronation Colliery	600
Landau Colliery	600
	4,500

This amount of coal is sent to the Rand gold mines, the railways, and other Transvaal consumers daily, excepting about 300 tons per day which is principally used for shipping purposes at Delagoa Bay. All these mines are equipped with up-to-date machinery.

The Transvaal and Delagoa Bay Collieries are hauling coal from two shafts. At one of these the coal is brought to surface up a vertical shaft, the cage bringing up two trucks at a time; the other shaft is an incline, dipping at an angle of 13°. The coal is brought up this incline shaft by a Robbins belt,[1] which is capable of dealing with 2,000 tons per day. When working to their fullest capacity the Middelburg Coal and Coke Company can deal with 1,500 tons per day, the Coronation and the Landau each about 1,000 tons per day, and the Witbank Colliery about 1,300 tons per day. Thus it will be seen these mines only have a demand for some 65 per cent. of their full output. The Witbank Colliery has lately installed Sullivan coal-punchers worked by compressed air. These have proved to be a great success, and as a result of their application the number of boys is reduced from 1,100 to 800, and the cost per ton considerably lowered.

The Witbank mines (with the exception of Witbank Colliery) are working about 10 ft. of coal, out of a total thickness of 14 ft., 4 ft. being left as roof, as the shale above is not very strong. The Witbank Colliery only works 5 ft. to 6 ft., the top portion being inferior coal. All these collieries have a shale-band about 12 in. in thickness running through the coal at a distance of some 5 ft. from the floor, this bottom portion of 5 ft. being by far the highest grade coal worked in the Transvaal at the present time. The 2 ft. next the floor is sold as blacksmith coal and gas coal at about 25s. per ton landed at Johannesburg; it yields about 7,700 cubic ft. of gas per ton. The following is an average analysis of the Witbank coals :—

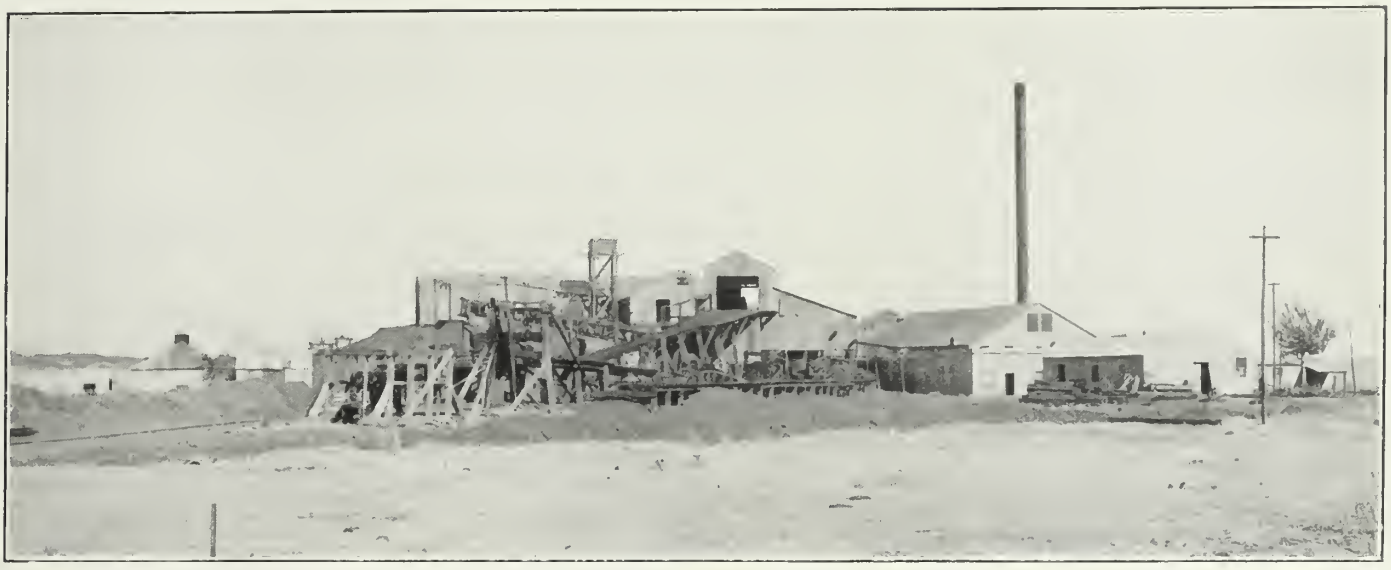
Moisture ..	.	1·55 per cent.
Volatile matter ..	..	23·19 ,,
Fixed carbon ..	..	64·71 ,,
Ash	..	10·10 ,,
Sulphur .. .	..	·42 = 99·97 per cent.
Specific gravity ..	..	1·226
Calorific power ..	..	13·76

PIT-MOUTH OF THE CENTRAL COAL MINE, VEREENIGING ESTATES, LTD.

All the mines, with the exception of the Landau Colliery, have only one seam, which is thought to be the bottom of the five seams of the series. Of these five seams the remaining four must have been denuded. The Landau Colliery has another seam of coal 5 ft. thick lying above the main seam. This is a good gas and household coal, and gives about 13·5 calorific power.

From the Landau Colliery, proceeding southwards towards the Springs Collieries, along the New Witbank-Springs railway line (now in course of

construction), boreholes have been put down, and three seams of coal have been discovered, the thickness being respectively 7 ft., 9 ft., and 20 ft. of coal—the 20 ft. seam corresponding to the Witbank seam. As the Springs and Wakkerstroom, down to Utrecht and Vryheid in Natal; but the chief deposits in the Transvaal which are to be reckoned upon in the near future are in the catchment areas of the Wilge River, the Oliphants (Big 9s. 4⅔d. per ton to 6s. 8d. per ton during the same period. From 1902 to 1905 the amount sold rose from 1,590,333 tons to 2,606,799 tons, and the price fell from about 8s. per ton all round to about 6s. 7¾d. per ton.



GENERAL VIEW OF SURFACE WORKINGS, CENTRAL COAL MINE, VEREENIGING ESTATES, LTD.

collieries with one exception are nearly worked out, the coal along this new line will be a strong rival to that of the Witbank Colliery in a few years, and is likely to create a very vigorous industry. Passing on from Witbank along the railway line further east towards Delagoa Bay, the Belfast Colliery is next met with. It is now producing about 500 tons per day. The coal here is slightly inferior to the Witbank article. The seam is some 20 ft. thick, without any shale-band, and the calorific power is 11·3. This colliery supplies fuel to the mines and railways, and to vessels at Delagoa Bay.

On the Transvaal-Natal railway near Balfour station, 3½ hours' length of journey by rail from Johannesburg, are situated the South Rand Collieries. The seam worked here contains a high percentage of ash, is distinctly low in carbon, and is made up of alternate layers of anthracitic and semi-bituminous coals with bands of very inferior coal or shale between them. The mine has been laid out for an output of 2,000 tons per day, and has one of the best equipments in the Transvaal. This venture comes within the Lewis & Marks control.

To the eastward of the Springs area large coal-beds are found, running through the districts of Bethal, Ermelo, and Little), and the Van Kolders rivers. The quality of the coal in these localities is generally very good. Seams of a specially high grade, combined with a valuable oil-shale, occur a few miles north of the town of Ermelo.

From the statistics of the Mines Department, it appears that during the official year ending in June, 1905, some 2,513,824 tons of coal from Transvaal mines were sold, valued at 6s. 11·52d. per ton at the pit mouth. The two largest coal-producing areas are Springs-Brakpan (which supplies about 45 per cent. of the total output for the Colony) and Middelburg (supplying about 47⅓ per cent.). In the former district "round" coal is worth about 7s. 5½d. per (short) ton at the pit mouth, "nut" coal about 6s. 3¼d. per ton, and "fines" about 2s. 11½d. per ton; average price, about 7s. In the Middelburg district "round" coal realises 6s. 10½d. per ton, "nut" 5s. 9d. per ton, and "fines" 2s. 2d. per ton—an average of 6s. 8d. per ton. In the other districts the prices reached are 9s. 1¼d. for "round," 4s. 7¾d. for "nut," and 2s. 3d. for "fines," or an all-round price of 8s. 6d. per ton. It is interesting to note that while the quantity of coal sold in the Transvaal rose from 548,534 tons in 1893 to 1,907,808 tons in 1898, the all-round price at pit mouth fell from about (The short ton of 2,000 lbs. is always used.)

During the official year 1904–5 there were 28 collieries contributing to the output of the Transvaal. In December, 1905, there were 25 producing collieries—seven in the Boksburg district, 11 in the Middelburg district, and seven in other districts (principally Bethal, Ermelo, and Belfast). Competition is exceedingly keen, the demand is strictly limited, the supply far within the existing capacity of the mines, and the price obtained leaves but a small margin for profits. When better times for the coalmaster come, and expansion is warranted, the factor of the maritime and export market may well be eliminated from the new calculations. There is little doubt but that—as far as Delagoa Bay, and any new port yet to be established on the coast of Zululand or Amatongaland, are concerned—the different extensive coal seams occurring in the carboniferous rocks of the Lebombo range of hills will amply meet any demand of such a nature.

Coal-mining on modern lines offers few points of interest to the ordinary reader, and there are virtually no specific features in Transvaal colliery practice. It will suffice to note that

the seams usually lie nearly horizontal, and the "faulting" seldom interferes seriously with the winning of the coal. It is not often that water is met with in quantity. Fire-damp is hardly known, and then only in a very small degree.

A recent writer on South African resources estimates the amount of Transvaal coal (excluding the Lebombo Range and Limpopo Valley possibilities) at 300,000,000,000 tons, and, deducting 80 per cent. for inferior coal, arrives at a nett quantity of 60,000 million tons. This is contrasted with :

The United Kingdom..	198,000	millions of tons.
Germany	112,000	,,
France	18,000	,,
Transvaal	60,000	,,

In the home of the British race the wealth of the nation has been created by the industry of the inhabitants, aided by the great local deposits of coal and iron that are available. The Transvaal, in addition to its vast resources in gold, has both coal and iron in abundance, and of the best quality. Do the English-speaking peoples realise this grand heritage, and the place into which it will lead the Transvaal in the world of industry and commerce ?

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